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THE Chemical Age

VOL. LXXII 28 MAY 1955 No. 1872

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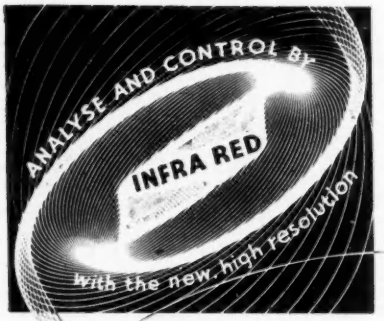

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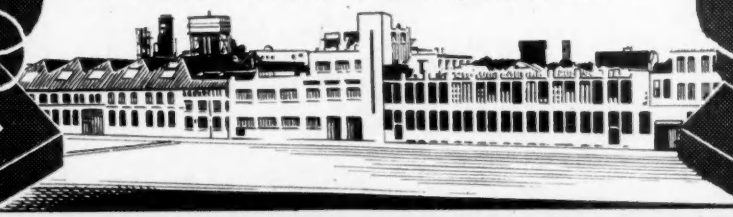

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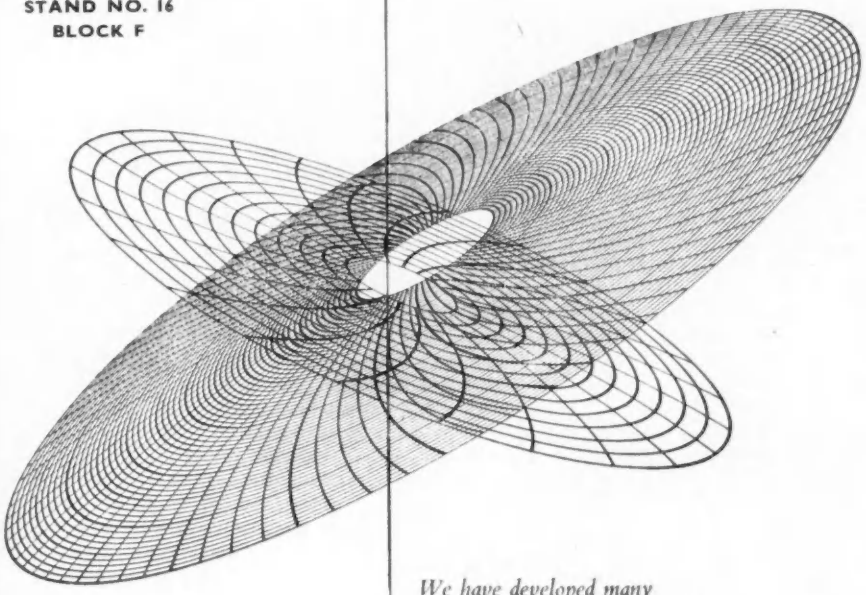

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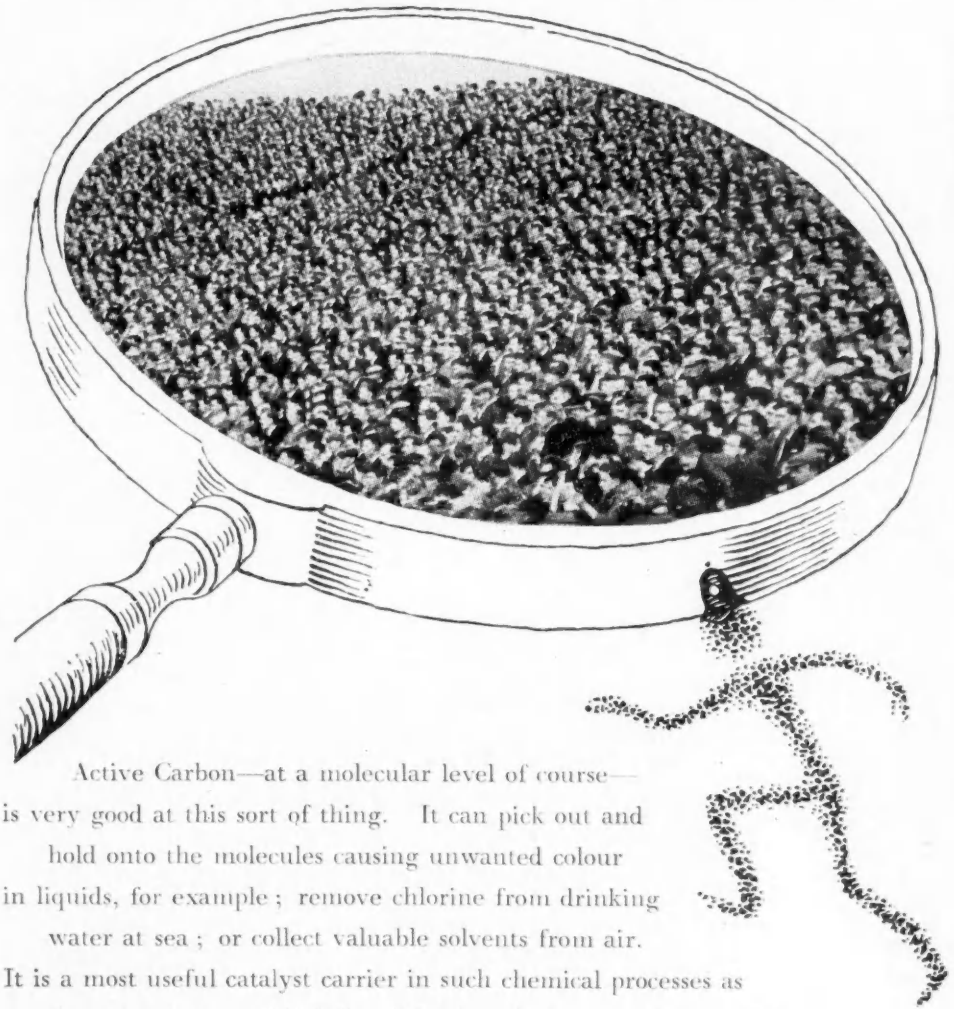

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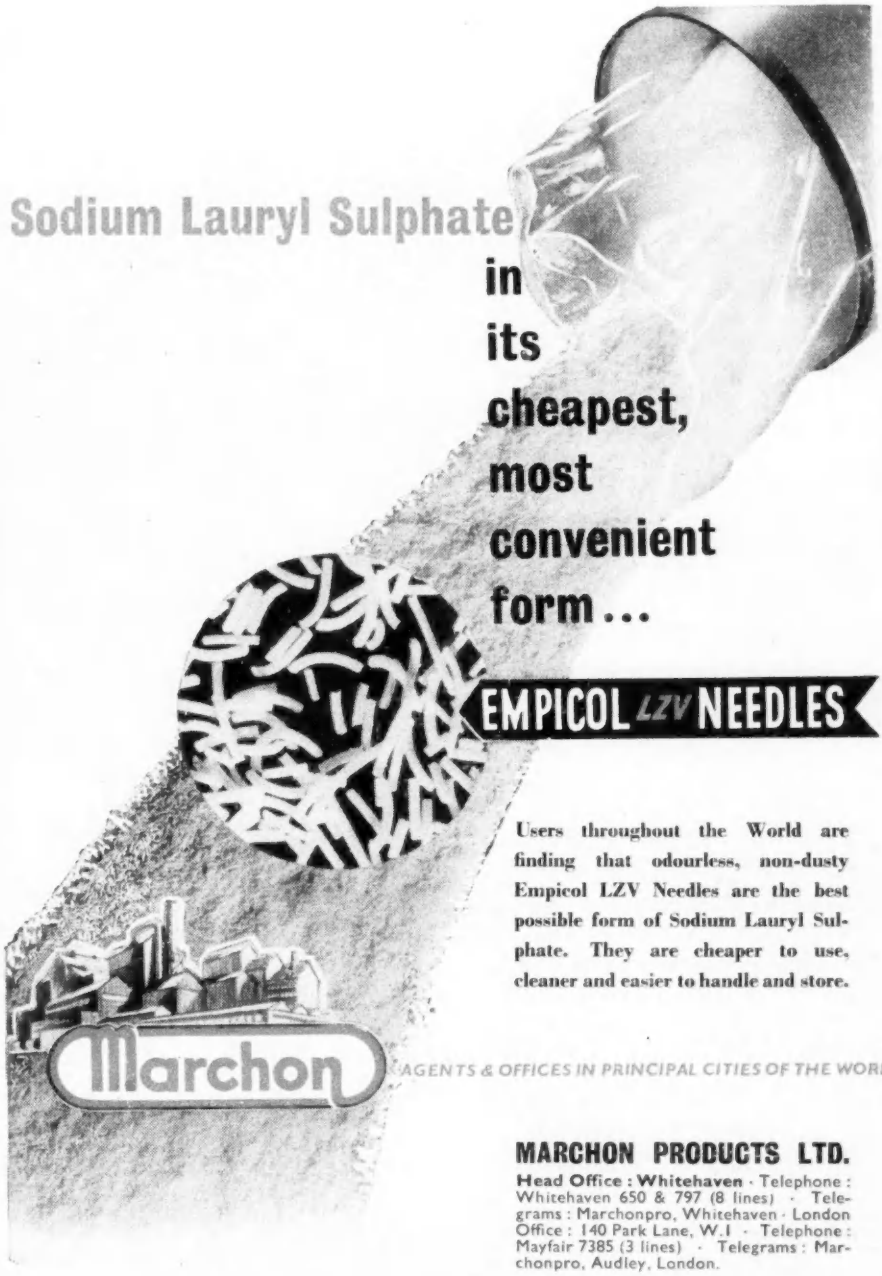

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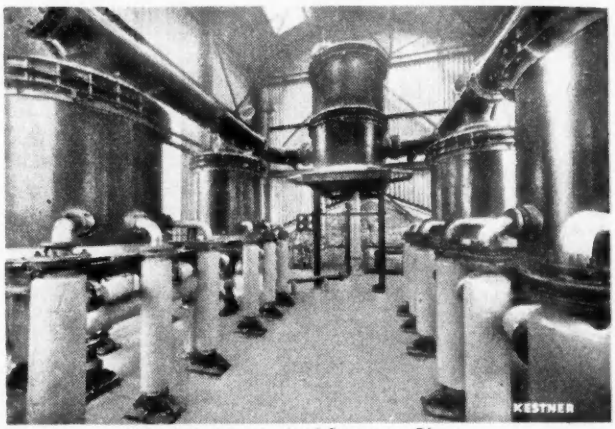

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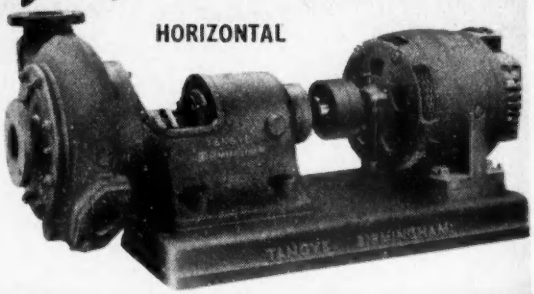

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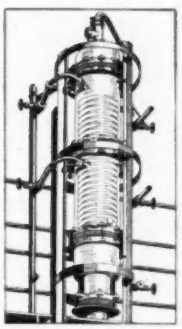

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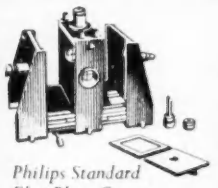

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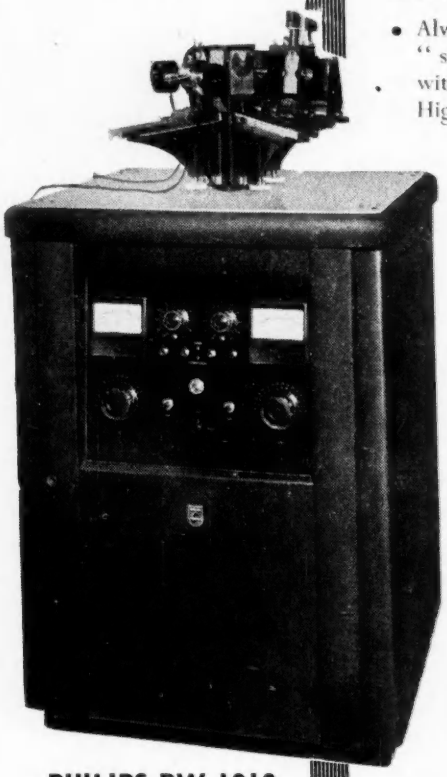

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Volume LXXII
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Established 1919

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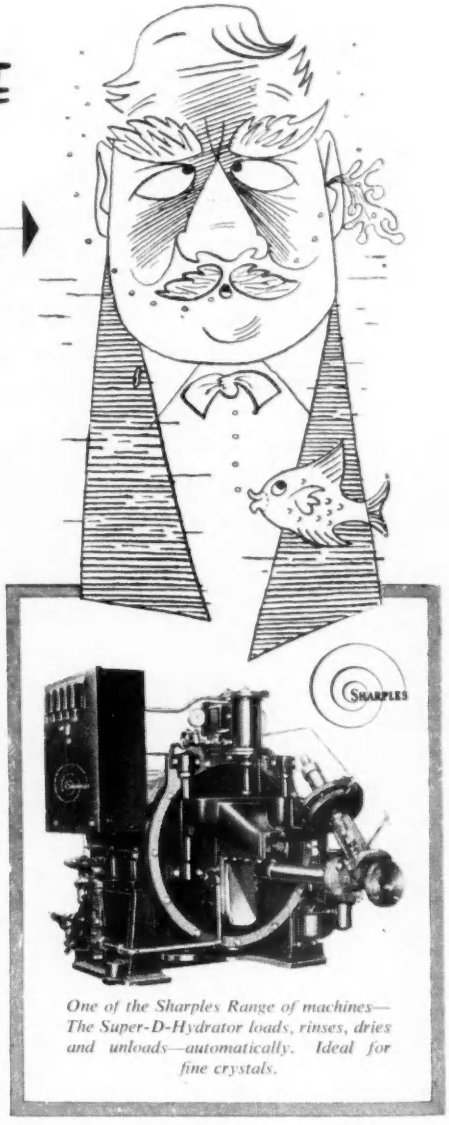

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Lessons from ACHEMA

IT is said that almost 300 people travelled to Frankfurt from Britain to attend ACHEMA XI and the European Convention of Chemical Engineering. Of those met, not one failed to express amazement at the size and excellence of the exhibition and complete admiration for the strength, vigour and unity of German industry. Even those who had attended previous ACHEMAs were surprised, for this year's exhibition was twice the size of ACHEMA X held in 1952. A visitor from one of the Eastern countries said: 'Before the war, when you thought of chemicals or chemical plant, at the same moment you thought of Germany. This wonderful exhibition proves that Germany is again the leader'. A Swiss consultant remarked: 'What a pity it is that Britain has fallen so far behind the Germans and the Americans in chemical engineering research and plant and apparatus design and construction'. Yet here in Britain there are still many people who do not realise the grave danger.

In 13 halls, more than 750 exhibitors from 13 countries filled an area of 550,000 square feet with exhibits valued at £2,000,000. Two months before the opening, 10,000 people from 48 countries had registered to attend the European Convention, including 4,500 students from 18 countries, and it is estimated that almost 150,000 people passed through the gates of the exhibition grounds during the run of ACHEMA XI. Not one of these visitors was a souvenir-hunting schoolboy or a chore-escaping housewife; each and every visitor was a person with technical knowledge. The primary purpose of the ACHEMAs is to foster co-operation between the users of chemical plant and equipment and the manufacturers, but it does far more than that. It creates tremendous goodwill and builds up for the German industry a reputation which is bound, sooner or later, to make the selling of their goods easier. At one stand visitors were so numerous that appointments with the firm's various experts were being made a day or two in advance. Descriptive literature on some stands was exhausted before the exhibition closed in spite of the fact that not one pamphlet went into a schoolboy's satchel or into the litter baskets outside the halls. Throughout practically the whole of the eight days the 22 miles of the exhibition route were well-filled with visitors, for the majority did not stop for merely an hour or so, but spent two or three days. There was so much to see, so much to learn, so much to discuss!

From the 700-page catalogue it is learned that there were 42 exhibitors in the Research and Literature Section, 298 in Laboratory Apparatus, 148 in Measuring and Control Appliances, 33 in the New Chemicals, 124 in Constructional Materials, 65 in Production and Processing of Plastics, 79 in Weighing, Forming and Packaging, 87 in Gas and Water Techniques, 24 in Accident Prevention and Safety Precautions, and there were 415 exhibitors of chemical plant and equipment. There may not have been any sensations in the way of exhibits, but

the general level was amazingly high. It is not surprising, if ACHEMA XI can be taken as an indication of the health and strength of the German industry, that several big contracts in recent months have gone to that country in spite of British (and even American) competition. Unless we show more initiative and energy in the future, the British industry will suffer serious setbacks. The fact that so little chemical engineering research is being done in this country—that few or no British chemical processes are forthcoming—is a serious disadvantage.

What can be done ? Or, rather, what must be done ? In 1958 a Chemical and Petroleum Engineering Exhibition is to be held in the Grand Hall, Olympia, sponsored jointly by the British Chemical Plant Manufacturers' Association and the Council of British Manufacturers of Petroleum Equipment. The first of these bodies has approximately 209 member firms and the second 400, so that even if there is considerable overlapping, if each and every member supports this exhibition it will be a success. At Frankfurt, however, several British people expressed doubts that any exhibition held in Britain could be so impressive or so successful as one held in Germany.

It is not that the Germans are more capable or more talented than we are, although they may work harder and have a gift for organisation. The whole trouble, as we see it, is that the Germans realise more clearly the necessity to increase exports and are fully aware of the fact that the time has come for vigorous selling methods. The Germans have had to fight for markets, whereas, until recently, British manufacturers have had things very easy. Many British manufacturers of chemicals and chemical plant are not yet aware of the need to advertise. They argue that sales keep increasing without their spending money on publicity. They turn a blind eye to the progress being made by other countries and ignore the signs that competition is growing fiercer.

Germany has a smaller chemical industry than has Britain and yet it supports—and far more handsomely than does British industry—a larger trade and technical Press. Furthermore, German manufacturers are now placing advertisements in many foreign journals. Both the chemical and chemical engineering industries realise that everyone must work together not only for the common good of their industries, but also for the national good. The support they give research institutes, organisations like DECHEMA and the European Federation of Chemical Engineering, their trade and technical Press and exhibitions like ACHEMA is certainly paying dividends.

It is, we believe, most regrettable that British chemical manufacturers did not join with the BCPMA in holding a joint exhibition. By joining forces something really worthwhile was possible. Unfortunately, the ABCM is committed to supporting the BIF which has steadily gone downhill and which many people believe is due for extinction. The ABCM obviously believes that the BIF will gain new life under its new management, but many firms and organisations which have supported the exhibition for years are of the opinion that the 1956 BIF will be the last. The Fair which has just ended convinced many people of this. Not only were there fewer exhibitors, but many fewer buyers. The comments of some of the latter make it clear that the 1956 BIF will be even less well-attended than the 1955 Fair. Damaging comparisons are being made between the BIF, the Hanover and other Continental exhibitions.

German chemical and chemical plant manufacturers realise that they must pull together. It is the rule rather than the exception to pool information and join together to overcome common problems. Whatever else the German may be he is serious, practical, hard working and inventive. There are many firms in this country who could learn a great deal from their German rivals just as many firms in Germany could learn something from us. What a pity it was that many more British chemists, chemical engineers etc., did not visit Frankfurt between 14-22 May. It is certain that once British chemical manufacturers saw an ACHEMA they would not then be satisfied with a section of the 1956 BIF. The Germans can teach us a great deal about team spirit and the organising and managing of exhibitions.

Notes & Comments

Trichloroethylene Query

MEAL from soya beans after oil extraction with trichloroethylene has usually led to hæmorrhagic anæmia when fed to cattle. In fact, the use of trichloroethylene as an oil-extracting solvent has had to be abandoned for this reason three times in the past 45 years. As far back as 1912, cattle poisoning in Scotland was attributed to the use of trichloroethylene-extracted oil meal. Widespread outbreaks of cattle poisoning in Germany in 1923-25 were similarly diagnosed. More recently poisoning outbreaks of the same nature have occurred in America, Italy and Japan. A bold effort to investigate this problem has been made in the United States; two papers, both centred on Iowa State College, have appeared in the *Journal of Agricultural & Food Chemistry*, (1955, **3**, 413 & 420). Despite this, however, the source of toxicity has not been clearly isolated. Is it a breakdown product of trichloroethylene? Is it a combination of such a product with some component of soya bean? These probable explanations are still unproven. The only experimental reproduction of clearcut symptoms of toxicity was associated with a trichloroethylene-treated sample of casein; however, this at least has indicated that the cause of toxicity may be linked with some protein interaction product.

Oxidation Studies

DIRECT oxidation studies of trichloroethylene showed that the products—95 per cent liquid and 5 per cent gaseous—included dichloroacetyl chloride and trichloroethylene epoxide as liquids and phosgene, carbon monoxide, and hydrogen chloride as gases. The epoxide in the presence of iron broke down into chloral, dichloroacetyl chloride, glyoxylic and formic acids, and carbon monoxide. In this list of breakdown products there is no small toxic potentiality even if animal tests have largely failed to produce toxic effects. It is certainly remarkable that a fairly simple cause-and-effect trouble that has been known for nearly 50 years is still without a sound scientific explanation.

Italian Progress

THE recent survey of Italy's industries by *The Financial Times* showed that the chemical industry there has made notable post-war progress. A major factor in this has been the discovery of large reserves of natural gas; methane has been harnessed both as a fuel and as a chemical raw material. Indeed, as coal and electricity prices tend steadily to rise, this dual diversion to hydrocarbons is regarded as the main source of economic progress. It has been fortified by the oil strikes made recently in Sicily and in the Abruzzi for there is now the further hope that Italy can become much more self-supporting for liquid hydrocarbons. Production of chemicals had risen by 112 per cent above pre-war levels (1938) last year. Recent expansion (1950-53) is claimed to exceed that of any other chemical industry in Western Europe. Particular attention has been paid to fertiliser production. Although Italian farmers have not been high users in the past, fertiliser consumption is steadily increasing now. It rose by 12 per cent last year. The Italian fertiliser industry's economics are helped by export sales as well; fertiliser exports are quite new, but they are expanding rapidly. The price of ammonium nitrate has been reduced by a third as a result of methane utilisation. Urea as a fertiliser has now been introduced, a technical development that places Italy ahead of most other European countries. Synthetic resins and fibres are similarly making impressive advances. Nylon output has been doubled in the past two years. Terylene plants (under I.C.I. licence) are now being built. Antibiotics, vitamins, sulpha-drugs, and dyestuffs are all being produced at world-competitive prices, and their exports are all making good progress. If sulphuric acid production is still the best measure of a nation's

chemical industry, the verdict upon Italy's modern expansion is solid enough. In 1948 sulphuric acid production was 949,000 tons; in 1954 it had reached the record level of 1,850,000 tons.

Chemical Traders' Lunch

Importance of Australian Market

THE annual luncheon of The British Chemical & Dyestuffs Traders' Association was held at the Savoy Hotel, London, on Tuesday, 17 May, the chairman, Brigadier C. Norton Stafford, C.B.E., T.D., presiding.

Proposing the toast 'The Association', Sir Thomas White, High Commissioner for Australia, said that Britain was the centre of the commercial world but he invited members of the Association to visit Australia for it was an old army maxim that time spent on reconnaissance was never wasted. Even if they had a monopoly it was necessary to know their markets for someone else might enter the field and then it might prove too late.

Australia was an expanding market, especially for fertilisers and agricultural chemicals, and the scope was practically unlimited. Australia was the best customer that the UK possessed but she had to build herself up industrially for she was at the other end of the earth and had no near friends to which she could turn in times of trouble apart from New Zealand.

The more that Britain bought from Australia the less licensing of imports there would be. She had a wool economy but she produced other commodities which Britain could use. Australia, for instance, produced 35,500,000 gallons of wine a year and her people drank about six times more wine per year than did the British.

The preference that Australia had showed to imports from the UK since 1908 was not a matter of sentiment only; it was an affair of the head as well as of the heart. No duty was charged on dyestuffs imported from the UK while other countries had to pay at least 12½ per cent. There was no product produced in this country which did not receive preferential treatment in so far as import duties were concerned. Australia had to protect her home industries but each industry had to go before the Tariff Board and plead their case openly. Britain should not overlook the Australian market nor Australia as a source of supply. He wished the Association great prosperity and expanding trade.

Mr. G. S. Bache, the president, said that UK chemical exports had increased considerably during the past year and he was sure that the distributors and traders had played no small part in this increase. The country was constantly being urged to increase production but it was impossible unless full use was made of the country's expert merchanting facilities. The merchants were in an unique position to determine how much—what and at what price—should be produced.

The British had been arrogant in the past. They hadn't even bothered to learn the language of the people to whom they were trying to sell. But now, thanks to improved educational facilities, this was being overcome. It was known that manufacturers had large-scale programmes to increase their capacity to produce chemicals and the industry appeared to be headed for a period of prosperity. In spite of that he would have to emphasise the need to keep their Association alive and energetic. It was the duty of all members to support their organisation to the fullest extent.

Paper Trade's Prosperity

INSTEAD of the customary speech by the chairman at the AGM, Spicers Ltd. published a booklet which was circulated to all shareholders. In his statement, the chairman, Mr. Lancelot Spicer, D.S.O., M.C., says that all companies associated with the paper industry had had a prosperous year and that Spicers had shared in this.

The raw material on which the paper trade is dependent is pulp made from vegetable fibres and during the past 20 years this raw material has been extensively used for rayon. It now seems likely it may be used in making a substitute for wool. Demand for pulp has therefore been heavy, but it does not seem likely that in the future there should be any fears that the world's cellulose fibre supplies will be exhausted.

Scientific techniques are increasing the range of cellulose fibres which can be used satisfactorily for paper. An example is hardwood fibres, which are now in daily use.

Profits before tax of the Spicer Group for 1954 exceeded £1,000,000, a figure reached only in the years of 1950 and 1951.

I.C.I.'s Growing Strength

Dr. Alexander Fleck Answers Nationalisation Threat

AT a press conference held in the Board Room at Imperial Chemical House on 18 May the chairman of Imperial Chemical Industries Ltd., Dr. Alexander Fleck, outlined the most important details contained in the company's annual report for 1954 (see THE CHEMICAL AGE, 1955, **72**, 1135). In reply to a question from one of the journalists present, Dr. Fleck went on to attack the Labour Party's threat to nationalise part of the chemical industry. The board of directors would, he said, oppose by every proper means within their power any attempt to nationalise the company or any part of it.

Dr. Fleck commenced by pointing out that the consolidated sales of Imperial Chemical Industries and the 100 subsidiaries that make up the Group, had increased by £45,200,000 during 1954—a growth of 16 per cent. Domestic and foreign sales increased by approximately the same percentage.

It had been the company's policy to keep prices as low and as stable as possible, he said. Low and stables prices encouraged their customers to use more of their products: and as their products were used by very many British industries, they believed that their price policy aided and supported British industry as a whole.

Since the I.C.I. home trade price index had moved up by one point only between 1953 and 1954, the increase in home sales was almost entirely due to an increase in volume. The 16 per cent increase in value of exports also represented a substantial increase in the volume of their exports as increasing competition in export markets had kept prices down.

Record Outputs

These increases in the volume of sales had made heavy demands on producing plants: in many cases record outputs had been achieved—for example, caustic soda, silicate of soda, chlorine, nylon polymer, penicillin, methanol, urea, Dulux paints, polyvinyl chloride, polythene, etc.—and in some cases, notably in the plastics field with polyvinyl chloride and 'Perspex,' the demand was in excess of supply. Extensions to capacity were well in hand.

One of the more important new products now emerging from the early research and development stage was titanium. The experience of the General Chemicals Division in heavy chemical technology had been effectively applied to the development of a new process for the manufacture of raw titanium. The work of the Metals Division on the metallurgical problems arising in the fabrication of titanium into wrought articles also continued to make excellent progress.

Terylene's Future

The consolidation of their effort on Terylene, both organisationally and technically as well as in the extension of production facilities, was proceeding apace and there was every reason to believe that in the near future this product would have a substantial place in the firm's total business. Intensified development effort was being applied to the fabrication of Terylene type polymers into film and although there were a number of difficult manufacturing problems involved it was expected that this Melinex film would find a number of important uses in the electrical and other industrial fields.

The record consolidated turnover resulted from the high level of production in their plants at home, helped by production from new plants which came into commission during the year. The record trading profit of £49,500,000 was due to this high level of activity, coupled with improvements in manufacturing efficiencies. The £49,500,000 included approximately £2,250,000 profit from new subsidiaries in South America and Canada, consolidated for the first time, and to that extent was not strictly comparable with the £35,900,000 trading profit for 1953. Thus the increase, based on strictly comparable figures, was just over £11,000,000.

The sharp increase in depreciation provision from £11,500,000 to £16,500,000 was partly caused by the figures for depreciation brought in by the new subsidiaries, particularly Canada, and partly by depreciation on new plants brought into production, but they had specifically during the year to review their depreciation rates, having regard to the fact that in their industry rapid tech-

nological advances made it possible for plants to end their economic lives while still physically capable of high production. They had thought it prudent to increase the rate of depreciation in some of their Divisions by reducing their estimates of the remaining economic working lives of plants.

During 1954 the company's expenditure on new capital construction had amounted to about £34,500,000, while the Group capital expenditure had been no less than £45,500,000. The company's expenditure figure brought up the total expenditure since the end of the war on physical capital construction to £190,000,000, in addition to which working capital absorbed by higher production and increased price levels had required £28,000,000 and a further £40,000,000 had been expended in new investment in subsidiary and associated companies, making a total of £258,000,000.

Steady Development

Commitments for capital expenditure at the end of 1954 were approximately £18,400,000 for the company and £21,200,000 for the group but, including its commitments, the company still had to incur expenditure of the order of £65,000,000 on the completion of projects already sanctioned. Apart from these projects in hand, there was a steady stream of new projects regularly coming forward for the board's consideration, and in the foreseeable future expenditure on capital expansion was likely to continue at a rate not less than in the past. A few examples of major items were: extensions to titanium plants; new ammonia, fertiliser and urea plants; further increase in Terylene production, with plants for the manufacture of intermediates; extensions to polyvinyl chloride capacity; development of site and provision of services at Wilton Works, etc.

When asked about the Labour Party's nationalisation threats, Dr. Fleck said that I.C.I. was not concerned with party politics. It gave the same facilities to all its employees to stand for Parliament, irrespective of party. I.C.I. was concerned, however, with the suggestion that sections of the chemical industry should be nationalised, not least when this was openly linked with the company's name.

The chemical industry had been accused of being under tight monopoly control by private interests. I.C.I. represented only about one-third of the industry on the basis of numbers employed, and the great bulk of its products, both in number and value, were in direct competition with those of other organisations at home and abroad. Where I.C.I. was the main producer, it applied the same drive for improving and cheapening production as it did to the whole of its output. For example, its home prices for soda ash (its principal monopoly product) were the lowest in the world.

The selling price of I.C.I. products in this country had, on the average, risen by only 91 per cent since 1938, in comparison with a rise in the BOT Wholesale Index Price of 225 per cent, in spite of a rise in the average cost to I.C.I. of its raw materials of 272 per cent. The customer had, in fact, had the benefit of a great relative reduction in price. The average total earnings of employees in the company have risen by about 200 per cent since 1938. The gross return to the stockholders had risen by 150 per cent.

Effective accountability depended on much more than legal forms; equally, efficiency depended on management rather than on ownership. Good leadership was the first essential and would not only produce good results, but would make plain its stewardship for all to see.

The company strove for increased efficiency by every possible means in order to play its full part in raising the standard of life at home, and increasing the country's competitive position abroad. The company's volume of production had been approximately doubled since 1946, with an increase of only some 17 per cent in personnel. This rapid growth in productivity, with the willing help of the company's employees, was the result of technical advance based on research, capital expenditure and continous improvement in managerial methods of every kind.

Large & Efficient

I.C.I. was indeed large, whether measured by capital, by the number of people employed, or by the volume and value of production. It showed too that there had been continuous growth, as there must be in any healthy organisation. It was in large measure because of the scale of operations, which were highly complex and, in many cases, inter-connected, that high efficiency had been achieved.

A large organisation, like a small one, should be judged on its results rather than on the basis of political dogma. Those who

advocated the cutting up or arbitrary change of such an efficient and complex industry, must be unaware of the problems involved and the damage which could result.

From 1945 to the end of 1954, I.C.I. had spent £190,000,000 on new construction and modernisation. All this money had been found without difficulty from the investing public and by ploughing back resources. There were some 228,000 stockholders, now to the manufacture of new materials, such pany's employees who came under the Profit-Sharing Scheme. Much of the new money had come from pension funds, insurance companies and other institutions, representing the savings of many million people throughout the country.

This investment had followed the company's research and development work, costing about £8,000,000 per annum, and had led to the manufacture of new materials, such as man-made fibres, plastics and medicinal products.

'Challenge to Britain' advocated nationalisation to give positive control of the investment programme. In fact, all the company's major post-war projects had been carried out with the full knowledge of the relevant Government departments and, where appropriate, with their guidance and approval during the planning and development stage.

The company had given continuous attention to increasing its exports in line with national policy. As a result, these have risen from £26,000,000 in 1946 to £67,500,000 in 1954. If indirect exports were included, more than 40 per cent of its production went abroad.

Overseas Devlopment Stimulated

In addition, the company had played a major part in stimulating overseas development, particularly in Commonwealth countries. It had manufacturing interests in every continent and in some 20 countries, in a majority of which the nationals concerned had substantial shareholdings. The total turnover of I.C.I.'s overseas subsidiary and associated companies was now comparable with its home sales.

Nationalisation, in whole or in part, would inevitably have a most adverse effect on such overseas operations which, if they were to remain stable and prosperous, should be kept free from the internal politics of this country.

A main argument advanced for nationalisation during the post-war period was that it would improve personnel relations. Whatever might be the position in other industries, this could not be a valid reason for bringing I.C.I. within any scheme of nationalisation. The company had built up a good understanding with its employees of every grade; it regarded and, as far as possible, treated them as partners in the undertaking. It had Pension and Profit-Sharing Schemes which were an expression of this fact. In addition, no less than 43,000 of its factory payroll workers had staff status as far as security of employment was concerned, and had their wages guaranteed for six months in the event of sickness or accident.

Since the company's inception in 1926, its operations had been free from any serious industrial dispute. The board believed that the great majority of those who worked with them in the company were satisfied with the treatment they received, and that they too had pride in the part which they were playing in the progress of this great organisation.

Titanium Production

THE first plant for producing sponge titanium on a large scale in this country (belonging to Imperial Chemical Industries Ltd.) comes into operation this year and an annual output of 1,500 tons is expected. Although discovered at the end of the 19th century it is only during the last 10 years that the properties and uses of titanium have been fully understood and exploited. In the production of titanium sponge, Japan and the US have had a monopoly, but Britain has made great strides in recent years in the fabrication of titanium.

Of the plants fabricating titanium to semi-manufacturers in this country the largest are, Titanium Metal Alloys Ltd., formed in 1951 by the Henry Gardner Co., and the Sheffield alloy steel producers, Samuel Osborn & Co. Ltd. Other companies fabricating titanium include: High Duty Alloys, Daniel Doncaster, Jessops, and the English Steel Corporation. I.C.I. are the only producers of titanium sponge in this country.

The bulk of titanium imported has been from Japan and the US. The US, the world's main source of supply, estimates a production of 10,000 short tons this year.

Chemical Exports

Little Change From Last Month

APRIL exports were on the whole slightly less than those for March. This can be largely accounted for by the fewer working days available. Exports to Western Germany seem to have decreased by a fairly substantial amount, which is perhaps to be expected now that that country is practically back to pre-war production standards. Nevertheless we are still exporting more to Western Germany than at the same time last year. There has also been a fairly heavy drop in exports to the Argentine.

Copper sulphate exports have fallen off considerably since last month, as also have unprepared sulphonamides and ammonium sulphate. Lead tetra ethyl, exports of which have increased six- or seven-fold since last year, has shown no appreciable change in the last month.

One of the few commodities that have shown an increase over last month are plastics, and this reflects the increasing importance of the plastics industry in this country.

In conclusion it can be said these figures, although on the whole quite good, show little cause for complacency.

TABLE 1

VALUE OF EXPORTS IN £ : PRINCIPAL CUSTOMERS

	April 1955	Mar. 1955	April 1954
Gold Coast	338,356	323,567	315,422
Nigeria	440,537	396,922	368,522
South Africa	1,230,792	986,856	925,892
India	1,289,024	1,862,418	1,108,102
Pakistan	233,375	368,042	469,868
Singapore	293,982	368,753	248,573
Malaya	272,591	294,748	180,933
Hong Kong	286,471	336,758	348,501
Australia	1,555,784	1,715,034	1,239,989
New Zealand	721,225	661,047	430,725
Canada	478,279	441,187	777,801
Eire	544,338	599,092	531,621
Finland	262,869	264,466	273,296
Sweden	569,975	527,926	505,451
Norway	272,458	288,364	258,767
Denmark	334,814	320,823	353,084
Western Germany	350,628	527,695	288,045
Netherlands	589,259	617,073	697,451
Belgium	434,477	459,249	315,741
France	703,578	763,164	384,194
Switzerland	248,280	268,005	174,333
Italy	413,786	412,637	539,875
Egypt	218,702	343,955	162,712
US	678,533	699,039	857,481
Argentine	292,140	597,070	197,456
Total value of chemical exports	**18,795,346**	**20,790,496**	**16,238,490**

TABLE 2

VALUE OF EXPORTS IN £ : PRINCIPAL COMMODITIES

	April 1955	Mar. 1955	April 1954
Acids, inorganic	43,741	58,387	39,425
Copper sulphate	162,374	415,908	458,759
Sodium hydroxide	361,454	416,967	330,309
Sodium carbonate	169,748	277,410	213,860
Aluminium oxide	55,034	43,254	11,589
Aluminium sulphate	15,215	35,220	55,908
Ammonia	38,135	32,179	23,720
Bismuth compounds	30,145	35,689	25,908
Bleaching powder	36,976	58,345	39,076
Hydrosulphite	58,048	84,133	33,937
Calcium compounds, inorganic	44,537	30,833	56,998
Lead compounds, inorganic	41,865	31,668	40,051
Magnesium compounds	63,153	53,811	49,703
Nickel salts	47,820	78,106	54,175
Potassium compounds	26,328	48,609	42,065
Acids, organic and derivatives	80,858	56,044	68,555
Ethyl, methyl, etc., alcohols	102,522	165,441	116,402
Acetone	61,040	22,941	63,663
Citric acid	34,399	34,030	24,785
Sulphonamides, unprep.	84,351	129,367	45,218
Dyestuffs intermediates	113,651	151,356	157,305
Total for elements and compounds	**3,981,339**	**4,424,372**	**4,762,466**
Coal tar	75,225	82,977	84,240
Cresylic acid	52,048	79,176	39,516
Creosote oil	123,559	165,045	155,640
Total for tar products	**322,214**	**401,225**	**540,001**
Indigo, synthetic	41,579	43,672	81,841
Total for synthetic dyestuffs	**723,842**	**855,361**	**873,190**
Total for paints, pigments and tannins	**1,670,935**	**1,752,875**	**1,400,824**
Medicinal and pharmaceutical products total	**2,908,068**	**3,043,051**	**2,506,451**
Essential oils :			
Natural	83,137	57,805	33,665
Synthetic	67,545	142,049	65,486
Flavouring essences	96,821	114,177	100,254
Total for essential oils, perfumes, etc.	**2,125,680**	**2,028,370**	**1,692,031**
Ammonium nitrate	17,823	18,867	14,874
Ammonium sulphate	109,710	180,755	134,606
Total for all fertilisers	**185,027**	**258,899**	**211,509**
Plastics materials total	**1,962,575**	**1,741,814**	**1,569,156**
Disinfectants, etc.	102,574	69,108	76,243
Insecticides and fungicides	341,220	379,775	297,585
Rodenticides and weedkillers	107,834	157,777	85,560
Lead tetraethyl	1,194,609	1,303,800	178,287

A.I.Ch.E. Spring Meeting

Chemical Engineering Problems Discussed

AT the spring meeting of the American Institute of Chemical Engineers, held recently at Houston, Texas, papers were presented on a wide range of chemical engineering topics.

A process has been developed by R. Q. Wilson, W. H. Mink, H. P. Munger and J. W. Clegg, of the Battelle Memorial Institute, Columbus, Ohio, for dehydrating aqueous solutions of hydrazine by azeotropic distillation with aniline as an entrainer (see THE CHEMICAL AGE, 1955, **72**, 1052).

The process comprises three operations:

1. Distillation of an aqueous hydrazine solution, having a composition near that of the hydrazine-water azeotrope, in the presence of 70 weight per cent of aniline. About 70 weight per cent of the water was removed overhead as the aniline-water azeotrope.

2. Separation of the resulting aqueous hydrazine solution from the aniline.

3. Fractionation of the remaining enriched hydrazine-water solution to produce anhydrous hydrazine.

Work on azeotropic distillation has also been carried out by W. C. Hopkins and J. J. Fritsch, of the Celanese Corporation of America.

Polarity Differences Used

The complex mixture of oxygenated chemicals produced by the partial oxidation of aliphatic hydrocarbons contains several groups of close boiling compounds and numerous azeotropic systems. Isolation of pure products by ordinary fractionation is therefore not possible. The differences in the polarity of the several homologous groups of compounds can however be used to effect separations by azeotropic and extractive distillations. Typical examples show how a polar or non-polar entrainer or solvent alters the relative volatility of the key components and permits a pure product to be recovered from a complex fraction.

A new tool for plant control of the furfural extractive distillation flow rates and the compositions of streams of a commercial column were studied by G. G. Campbell and D. E. Berger, of Phillips Chemical Co. This column, in Plains Butadiene Plant, Borger, Texas, performs the separation of butenes-2 from normal butane. The data derived from five days of routine operations were plotted so that the operating trends, time of response to changes and 'normal' operation might be observed.

Continuous Butene Determination

The primary column control element is a Phillips 66 Automatic Infra-red Analyser which continuously determines the butene content of a sample from the vapour phase of a tray midway between the feed entry and the re-boiler. The control signal from the analyser's recorder is used to re-set the mean furfural flow rate and thereby control the column's separation. This system has been in operation for several years and has contributed greatly to economical operation.

Plant performance data were presented by J. A. Gerster and Tokuro Mizushina of the University of Delaware and T. N. Marks and A. W. Catanach of the Neches Butane Products Co. for a 13 ft. diameter, 100 tray furfural extractive distillation column separating iso- and n-butane from 1- and 2-butene. The column was put into operation in May 1953 at the Neches Butane Products Company at Port Neches, Texas. In addition to composition, temperature, pressure, and flow rate of the external streams, values are presented for vapour and liquid compositions and flow rates at a number of different locations within the tower. With the exception of the vapour compositions which were determined experimentally, the internal conditions were determined by heat and material balances. These data permitted calculation of plate efficiency over various small sections of the column. In the 50 tray rectifying section, plate efficiency for the isobutane-1-butene separation was constant at 20 per cent, while in the stripping section the plate efficiency varied from 25 to 45 per cent. The average for the entire column was 25 per cent.

The furfural column plate efficiencies compare favourably with those predicted from laboratory tests made before the construction of the column to evaluate the performance of the tray design to be employed. The laboratory plate efficiencies were obtained for the desorption of oxygen from oxygen-

rich water with air at the same conditions of volumetric gas and liquid rates to be encountered in the furfural column. When these values were suitably corrected for physical property differences between the two systems, the point efficiencies predicted from the laboratory data for the furfural column ranged from 35 per cent near the top of the column to 25 per cent near the bottom of the column, the average value being 29 per cent.

Hydrocarbon Hydrates

The effects of liquid hydrocarbons and aqueous glycol solutions on the formation of hydrocarbon hydrates were discussed by Frank R. Scauzillo of the Magnolia Petroleum Co., Dallas, Texas. Hydrate-formation conditions of temperature and pressure were observed for three hydrocarbon gases (0.595-gravity natural gas, 0.594-gravity gasoline plant residue gas, and a 0.698-gravity casinghead gas) in the presence of an excess of field brine or distilled water. Data were also obtained for three mixtures of the 0.595-gravity gas and a saturated hydrocarbon oil in the presence of excess brine, and for two mixtures of the 0.594-gravity residue gas and a 191-molecular weight absorber oil in the presence of excess distilled water.

The effect of aqueous glycol solutions was studied by observing the hydrate-formation conditions of the 0.595-gravity gas in five separate aqueous solutions of diethylene glycol and one aqueous solution of triethylene glycol. The combined effect of liquid hydrocarbon and glycol was observed in three mixtures of the 0.595-gravity gas and the saturated oil.

Hydrates formed during the presence of a liquid hydrocarbon phase seemed to be in greater abundance than any of the hydrates formed in the one-phase gaseous systems. In the high pressure cell, the formation of the hydrates was sufficient to completely stop the gravity flow of fluids in the cell. It is believed the stoppages occurred at the small, $\frac{1}{4}$ in. diameter opening connecting the chambers of the cell. In the presence of only glycol solutions, the gas did not form hydrates as abundantly as the hydrate formed when an oil phase was present. Therefore, a difference is established as to the relative effects of the glycols as compared to the oil. While the glycol acts to depress the hydrate temperature, it also reduces the degree of hydrate formation. This reduction in hydrate formation was very evident when experimenting with the higher glycol concentrations. On the other hand, it seems that the oil suppresses the formation of hydrates and the end effect is similar to the effect produced by super-cooling.

There are two main types of photosensitive glasses: Those in which colloidal metal particles are formed after exposure and development and which produce colours and those in which these particles can nucleate the crystallisation of other phases at the development temperatures. These glasses contain a photosensitiser and the photoactive agents. The oxidation state must be carefully controlled, both by the melting temperatures and the addition of oxidising or reducing agents. There is evidence that some of the photoactive agent is reduced, and this reduction may be necessary to produce centres or nuclei for the subsequent growth of colloidal particles, which would follow the basic photosensitive progress.

These problems were described by F. Schuler of the Corning Glass Works, Corning, New York.

After exposure, the glass is developed at an elevated temperature for which there is an almost linear relationship between the log of the development time to give the glass the same degree of development and the temperature. If the glass is heated fairly rapidly, the image will be less intense, and if heated very quickly, the latent image is destroyed completely. Nucleation at an intermediate temperature fixes the latent image permanently, although no colour is produced.

Energy of Activation

The nucleation phenomena are observed more easily in the second type of glass in which the colloidal metal particles nucleate crystals. This makes it possible to compare quantitatively the different nucleation and development times and temperatures. Metal particles too small to cause nucleation at the development temperatures, can be formed under some conditions, which will cause nucleation if the glass is cooled and then reheated. By developing the crystalline phase to the same degree at different temperatures an activation energy of about 19,000 cal./mole is associated with the growth of the crystalline phase, and this activation energy corresponds to that of diffusion processes in glass.

Hydrodesulphuriser

More Details are Available

SINCE our previous issue further information on the new Shell hydrodesulphuriser has become available. This new plant was started up in April of this year at the Stanlow refinery in Cheshire.

Extensive research showed that a high degree of desulphurisation with a relatively small amount of hydrogen gas could be obtained using a procedure in which the oil was allowed to trickle over a solid catalyst in a hydrogen atmosphere. It was found that under these low hydrogen recycle conditions the catalyst activity was not impaired at all. Moreover, it was shown that this technique could be applied to a variety of base materials and with catalysts of different nature.

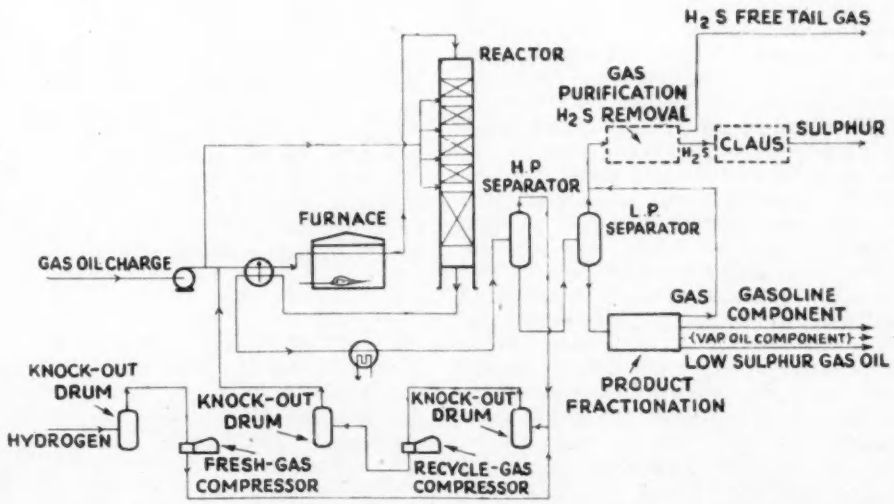
The low hydrogen recycle rates which are possible when applying the 'trickle' technique involve a significant saving in operating and capital cost, not only because of the reduced capacity and power consumption of the hydrogen recycle compressors, but also because of a reduction in the heat transfer surface area required, since a considerably smaller amount of heat has to be transferred through feed/products heat exchange. The fired preheater can also be relatively small.

The cobalt-molybdenum-alumina catalyst which is used in this process was developed especially for high selectivity, i.e. very little hydrogenation of aromatics even at a high degree of sulphur removal.

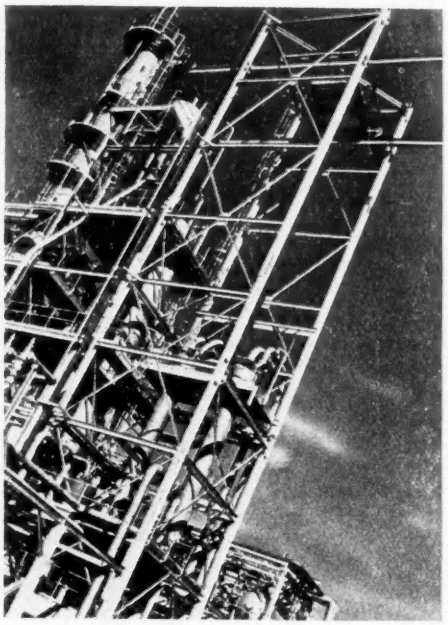
Although able to desulphurise quite a variety of feedstocks, the design was especially directed towards desulphurisation of light cat-cracked cycle oil. This feedstock has been processed so far during the initial stage of operation. A comparison of the commercial scale operational results with the design values has shown that the results are very satisfacory, being better than design. During the first weeks of operation, runs were carried out at different throughputs. Ninety per cent or more desulphurisation has been obtained for feed rates of 5,000 bbls/d and 7,000 bbls/d.

There follows a short survey of the design features of the unit.

The hydrogen, to be consumed during the hydrodesulphurisation reactions, and the



Simplified flow scheme



A close-up view of the new hydro-desulphuriser

hydrogen-rich recycle gas, used for catalyst protection, are compressed to the operating pressure with separate compressors. The compressed hydrogen-rich gases are combined with the major part of the charge oil and introduced into feed-product heat exchangers and reactor charge heater and heated to reactor inlet temperature. The remaining part of the charge oil is fed cold to the reactor to dissipate the heat of reaction. The reactor products, consisting of hydrogen, light hydrocarbons, partly vaporised desulphurised cycle oil and hydrogen sulphide, exchange heat with the reactor feed, are cooled down further and are finally introduced into the high pressure separator where a hydrogen-rich gas is separated. This gas is recycled and, if necessary, partly bled into the refinery fuel gas system, after being scrubbed with diethanolamine to remove the hydrogen sulphide. The HP separator liquid is flashed in the LP separator and introduced into the fractionation section.

In this section, consisting of a main fractionator and two side strippers, the desulphurised product is split into three fractions, whereas the dissolved light hydrocarbons and hydrogen sulphide are removed overhead. The overhead gases are combined with the gases flashed off in the low pressure separator. When processing light cat-cracked cycle oil the reactor products are split into a highly aromatic heavy gasoline fraction, a 220-260° C fraction and as a main product a bottom fraction boiling above 260° C. Reboiler heat for the strippers is supplied by a slipstream taken from the fractionator bottom stream. A reboiler furnace supplies heat to the main column.

The reactor contains in total nearly 25 metric tons of catalyst divided over six beds. A 2 feet layer of ceramic balls is added on top of the upper catalyst bed as a scale catcher. At a throughput of 5,500 bbls/d the space velocity amounted to 1.27 vol./vol.hr. and at 7,000 bbls/d to 1.59 vol./vol.hr.

About 20 per cent of the charge oil has to be used as cooling oil to limit the reactor outlet temperature to the desired level.

The 260° C + fraction contained only 0.3 per cent wt. sulphur. The sulphur contents of the other fractions were lower than anticipated.

The product distribution was as expected nearly 70 per cent on feed boiling >260° C. The gasoline had a clear research octane number of over 100, and amounted to 5 per cent wt. on feed.

All products met the specifications set forward for the various streams by the product department.

Temperature control of the various reactor beds by means of cold oil injected into the various mixing-redistributing trays proved to be excellent, no temperature runaways were observed, and the effect of injection of cooling oil could easily be traced by the temperature readings.

In conclusion, it can be said that the operation of the first hydrodesulphuriser is quite satisfactory. Over 90 per cent sulphur removal has been obtained when processing light cat-cracked cycle oil at 7,000 bbls/d.

Concordia Solenoid Valves

Jones & Stevens Ltd., instrument makers and engineers of Long Lane, Littlemore, Oxford, announce that they have concluded an agreement for sole distribution and manufacture under licence of Concordia solenoid valves and Heidolph miniature cooling motors and agitators. The Concordia range covers solenoid valves for use with oil, air, gas or chemical solutions.

British Plastics Exhibition

First Canadian Presentation

THE third British Plastics Exhibition opens at Olympia on 1 June and is to continue until 11 June. Like its predecessors in 1951 and 1953, it has been sponsored and organised by the journal *British Plastics* with the support of the British Plastics Federation.

The exhibition covers materials, fabrication, processes, equipment and finished products. It is aimed at the plastics industry, consumer industries, and, more so this year than previously, the general public. Over 120 firms are represented.

Exhibits are grouped roughly into three divisions. Finished products and plant and equipment share the ground floor, each on a different side, and on the first floor are the plastics material manufacturers.

Being held concurrently with the exhibition (from 2 to 9 June in the Convention Hall on the first floor) is the British Plastics Convention. It consists of 20 papers, and sessions will be held under the following headings: 'Polymer structures and Properties' (two parts), 'Expanded Plastics', 'Thermoplastics', 'Extrusion', 'Work Study and Productivity', 'Injection Moulding' (two parts), 'Patents', 'Foundry Resins' and 'Glass Reinforced Plastics' (two parts). The full text of the papers and a record of the succeeding discussions will be published in the autumn. The sessions will be held each morning and afternoon, starting at 10.30 a.m. and 2.30 p.m. respectively.

The British Plastics Federation have a stand at the exhibition, at which information about the industry and about membership of the Federation can be obtained.

Joint Canadian Display

Although most of the exhibitors are British, 15 Canadian firms have combined, with the Canadian Government, to show their products (Stand No. 48). This is the first time that such a comprehensive display of Canadian chemicals and plastics has been arranged in the UK, although a small selection of items has been shown with other commodities at trade fairs. It is an indication of the rapid growth of the Canadian chemical industry, whose production in 1954 is estimated at a record $900,000,000, compared with $848,000,000 in the year 1953.

The Canadian firms exhibiting are: The Arborite Company, BA Shawinigan, Canadian Chemical & Cellulose, Canadian Resins & Chemicals, Monsanto (Canada), Naugatuck Chemicals, North American Cyanamid, Northern Pigment, Polymer Corporation, Richmond Plastics, Shawinigan Chemicals, Shirlite Products of Canada, St. Maurice Chemicals, St. Regis Company (Canada) (Panelyte Division) and Canadian Industries (1954) Ltd.

A. Boake Roberts & Co.

Among the Britsh firms exhibiting are A. Boake, Roberts & Co. (Stand No. 72), who are showing, in addition to samples from their existing range of plasticisers and stabilisers, examples of their latest developments in these fields. Outstanding among these are the epoxidised oils, which show remarkable stabilising properties for vinyl polymers.

The British Oxygen Company (Chemicals Division) (Stand No. 88) features melamine and polyvinyl acetate, the latter being produced at the company's new factory at Chester-le-Street, Co. Durham.

On the stand of Howards of Ilford (No. 69), the emphasis is on the use of cyclic chemicals as solvents, plasticisers, etc., in the production of plastics. I.C.I. (Stand No. 80) display the use of plastics in the home, and Shell Chemicals (Stand No. 83) feature their Epikote resins.

The Monsanto exhibit (Monsanto Chemicals and Monsanto Plastics, Stand No. 68) features Lustrex polystyrene moulding material in several grades, including Lustrex Hi-Flow 55, a fast flowing polystyrene for intricate mouldings needing a long flow. Other products of interest to the plastics industry include the Aroclors, a range of chlorinated diphenyls, which offer flame resistant qualities when used as plasticiser extenders in PVC cable coverings, industrial beltings and similar applications.

Of particular interest on the stand of W. Edwards & Co. (London) (No. 17) is the Formac vacuum forming machine which the firm are making under licence from the

Swiss company Hydro-Chemie. This unit is comparable to the largest American machines. Exhibited is the Model 2G5 twin table machine with an effective moulding area on each table of 40 in. by 60 in. and a maximum depth of draw for female moulds of 22 in. Also displayed are two of the firm's latest vacuum evaporative coating units.

Bakelite Show Range

Bakelite Ltd. (Stand No. 74) show the range of their materials and articles made from them. Among the products supplied by the company are phenolic and urea resins, laminates, vinyl resins, emulsions, extrusion and moulding compounds. Also on display are decorative laminates produced by the associate company, Warerite Ltd.

Following the installation of new plant, The Telegraph Construction and Maintenance Company (Stand No. 29) are featuring Telcothene coated papers and boards up to 72 in. in width. Telcothene is suitable for use where a heat sealable, hygienic material with low water vapour permeability is required. Telcon are also showing metal foil laminate for packing material for service equipment to be stored under tropical conditions and there is a short demonstration showing the versatility and ease of application of Telcothene powder to metal objects of irregular shape. The powder when fused imparts to metal surfaces an insulated plastic coating which provides protection against corrosion, mould growth and fungus and is chemically resistant.

Size Plus Variety

British Geon Ltd., British Resin Products Ltd. and Distrene Ltd.—the three plastics materials manufacturers in the Distillers Industrial Group—state that they will stage one of the largest and most varied plastics displays ever presented. Their three-in-one stand (No. 65) will develop three main themes—'Plastics in the Home', 'Plastics in Transport' and 'Plastics in the Mines'—with 'Plastics in Chemical Plant' and other interesting displays added for good measure.

Over three hundred plastics items are displayed—apart from the plastics raw materials from which they are made. In addition, many uses of resins and plastics are illustrated in the construction, fittings and furnishing of the stand itself.

Vapour Phase Analysis

Demonstrations at Conversazione

TWO models of the vapour phase chromatographic analyser were on view on the I.C.I. stand at the Royal Society Conversazione at Burlington House, London, on 19 May. Made by Griffin & Tatlock and Metropolitan-Vickers, the models gave working demonstrations of vapour phase partition chromatography which was developed by Martin & Synge who were awarded the Nobel Prize for Chemistry for 1952 in recognition of the importance of VPPC.

A model of the Metropolitan-Vickers Electrical Co. Ltd. was exhibited at the Physical Society's exhibition at the Royal Horticultural Hall, London, in April (see THE CHEMICAL AGE, 1955, **72**, 936).

Developed almost exclusively by British chemists, vapour phase chromatography is now being extensively used in the laboratories of several organisations here. It has speeded up the analysis of organic chemicals which have been an increasing problem to chemists responsible for control of quality and analytical research.

When a small drop of a liquid mixture is injected into the VPPC apparatus, it is vaporised and the vapour swept through a long, narrow tube filled with packing which separates the individual components so that each is swept out of the tube at a particular time. As each one leaves, it effects the electrical resistance of a hot wire. The electrical changes are recorded as peaks on the moving chart of a recorder; the position of each peak revealing the identity of a component, while the height of the peak gives the amount present.

Tiny samples can be analysed for as many as 12 components in 15 to 60 minutes. The method works equally well with small volumes of gas mixtures.

A spokesman for Griffin & Tatlock on the I.C.I. stand told THE CHEMICAL AGE reporter that his firm were now producing the machines in numbers and hoped to develop a substantial export sales. Price complete is £625. The Metropolitan-Vickers model, designed for use in plants, is priced at £565 plus £242 with the recorder.

I.C.I., who worked out details of the analyser, have had them in routine use for more than a year.

BISRA Annual Report

Chemistry & Metallurgy of Iron & Steel Studied

PRINCIPAL investigations undertaken during the year ending 31 December 1954 are summarised in the 11th Annual Report of the British Iron and Steel Research Association. The demand for research work continues at a high level, but with an income only slightly more than that of the previous year it has been necessary to make a careful selection of research projects to ensure that those that are needed most and at the same time show high promise of success have a place in the programme. The Council is of the opinion that there is now a place for a limited amount of sponsored research, provided that the Association has the requisite background knowledge and experience and the specialised equipment with which to undertake the investigations.

Several manufacturers of steelworks plant and equipment are already associate members, and they are specially interested in the research being carried out by the Plant Engineering Division. By a special arrangement, members of the Society of Furnace Builders are permitted to become associate members of BISRA, and it is hoped that similar negotiations through other trade associations may result in further support from makers and suppliers of plant.

Corrosion Advice Bureau

Other interesting developments have been the formation of the Steel Users' Section and the Corrosion Advice Bureau. It was found that a very large proportion of the inquiries from both members and non-members related to problems of corrosion and, hence, rather more of the resources of the corrosion laboratory are being devoted to answering these inquiries.

The Methods of Analysis Committee of the Metallurgy Division has concerned itself with the development of reliable analytical methods for the determination of both large and small amounts of various elements in steel and associated materials.

The British Standard gravimetric method for the determination of sulphur is confined to carbon steels, and the combustion method, which relies on comparison with a sample previously analysed gravimetrically is recommended for more complex materials. The gravimetric method is, however, valuable as a routine procedure for many alloy steels.

Careful examination of the technique has revealed several sources of error in the determination of nickel as the glyoxime complex and an alternative method in which the interference of copper and cobalt is overcome by the addition of ammonia or cyanide has been developed.

Spectrographic Standards

Seven mild steel spectrographic standards containing varying controlled amounts of 17 residual elements are now being analysed by chemical methods and should shortly be available for distribution through the Bureau of Analysed Samples. Routine spectrographic analysis of residual elements will be considerably facilitated in works laboratories possessing the necessary equipment when these standards are in current use.

A serious disadvantage of spectrographic analysis is that elements such as carbon, sulphur and phosphorus have to be estimated chemically, and a prototype spectrograph with which these elements could be determined is being developed by a British manufacturer. As soon as it becomes available systematic tests will be made in the Division's analytical laboratory.

The electron probe technique of microanalysis, originally proposed by Castaing, is to be investigated. The work will be done at AEI laboratories, Aldermaston. The apparatus used has three main parts; the electron-optical system for producing a high intensity electron probe, the X-ray spectrometer and detector and the optical system for viewing the irradiated area. Efforts will be made to design and build an apparatus with which elements down to and including nitrogen and carbon can be analysed.

The Chemistry Department is carrying out a series of investigations on systems consisting of iron with small traces of other elements. A study of the thermodynamics of sulphur in solid iron and steel has shown why the addition of sufficient manganese will overcome the hot-shortness of iron containing sulphur. The part that oxygen may

play in hot-shortness has not yet been examined.

The Corrosion Section has formed a publicity panel to study and advise on ways of obtaining wider application of methods of combating corrosion. As a result of meetings with various professional engineering institutions a booklet has been published, setting out what is known about the choices that face engineers and others concerned with anti-corrosion measures.

A series of specifications on the painting of steel structures has been issued in the US by the Steel Structures Painting Council, and a critical abstract of these specifications has been prepared by the Corrosion Section and copies widely distributed in this country and abroad. The adoption of these recommendations would do much to eliminate the great and unnecessary waste of steel and money resulting from neglect of the elementary features of correct painting procedure.

Protective Coatings

A second report on the protection of iron and steel by metallic coatings and non-metallic coatings other than oil paints has been published in the *Journal of the Iron and Steel Institute*. The results confirm earlier conclusions that coatings of zinc and aluminium give excellent protection to steel exposed to atmospheric corrosion. In industrial areas, good results are obtained with lead coatings, while for immersion in sea water, zinc is superior. Vitreous enamel and thickly sprayed coatings of cement-asbestos have given good protection in atmospheric tests.

Tests made on welded ship plate have shown that there is no evidence that welding has any effect on the corrosion by seawater of unpainted plates.

Tests have been continued to find the most effective compounds which, when added to waters, would confer immunity from corrosion to iron and steel. It is hoped that a final report will be produced some time this year.

The *Journal of the Iron and Steel Institute* will contain shortly a report on experiments that have been carried out on wrought iron. Iron railings erected in 1862 show the same kind of corrosion as has been produced in recent laboratory work. This demonstrates that the advantages of wrought iron are not realised if the quickly-corroding zones extend to the surface.

Shell Developments

THE Shell Transport & Trading Co. 'Survey of Activities,' a booklet with coloured illustrations, describes the main work of the various sections of the group.

The chemical business, which on the basis of turnover ranks the most important in the world, further strengthened its position in the petrochemical field in many countries. Among the chief developments was the beginning of operations at the organic solvents plant at Pernis, Holland, and the expansion of the plant at Berre-l'Etang, France.

The production of synthetic resins again increased at Houston, Texas, and Pernis and at Stanlow building of plants for the manufacture of similar synthetic resins and intermediates was started. At Wesseling, near Cologne, Germany, construction of a plant, owned jointly with a German chemical concern, to manufacture polyethylene plastics, made good progress. Construction was started on a plant at Shell Haven for the manufacture of detergent alkylates.

Salt by Pipeline

A SYSTEM by which a vehicle carrying salt in bulk can discharge its load directly into bins, even if they are on the ground or above it, is described in the May issue of *The I.C.I. Magazine*. Bulk salt has for many years been carried in open railway wagons and lorries, but the free-flowing nature of dried vacuum salt has made it difficult to carry in conventional vehicles.

The new system has been perfected after a great deal of experimental work. In it the vehicle is fitted with an air discharge system driven by its engine. The salt is pumped through a pipeline to the customer's storage bin.

Advantages of this method are that the cleanliness of the salt is ensured and the expense of bags, bag filling and bag handling is eliminated.

Dollars for Australian Plant

A US company, The Atlas Corporation will invest $1,250,000 in a private Australian uranium company, The North Australian Uranium Corporation. The Corporation's deposits are in the South Alligator River area. The agreement calls for the building of a treatment mill and provision of drilling and mining equipment.

NPL Annual Report

Important Metallurgical Work Carried Out

OPPORTUNITY to see some of the work carried out by the NPL was given to scientists and the press at the annual open day held on Friday, 20 May. Demonstrators were available to discuss and explain any points concerned with the exhibits. It was hoped that any visitors who found that sections of the laboratory's work were specially related to their own problems would make arrangements to return and discuss them in detail with the staff concerned.

Under its present policy the laboratory encourages industry to undertake its own testing as far as possible during production. In appropriate cases the laboratory will assist in the development of prototype apparatus and will also advise on control and sample testing of products within its scope.

A full account of all the work of the NPL is contained in the report for 1954, published by the Stationery Office, price 4s.

The NPL is not, of course, concerned with problems of pure chemistry, but much of its work has definite chemical interest.

Work has been continued by the Electricity Division on the properties of certain dielectrics (see THE CHEMICAL AGE, 1954, **70**, 1097). The dielectric constant of benzene has been determined at a microwave frequency and the value found to be the same as that obtained at low frequencies. It is clear that the value holds good for any frequency likely to be used in practice.

Examine Silicone Rubbers

Silicone rubbers loaded with various mineral fillers, and methacrylate resins, which are of industrial interest, are being examined for the ERA, and quartz which has been subjected to pile irradiation and undergone a change of colour has also been examined and found to have properties appreciably different from ordinary quartz.

The new laboratories of the Metallurgy Division are now in full use. The apparatus in the X-ray section is in steady use, but in the radioactive tracer laboratory attention is still being given primarily to the development of technique. The application of tracer methods to metallurgy problems has, however, commenced.

Titanium has become of increasing practical importance in the last year and attention has had to be given to methods of analysis and sampling, and to referee analyses.

Titanium Alloys Studied

Intensive studies have been made of the system titanium-iron-oxygen, together with an investigation of titanium-oxygen alloys containing up to 35 per cent of oxygen. In this work special methods have been used for determining the melting range of the alloys, and for heat treating and quenching small metallographic samples accurately at very high temperatures. A virtually complete phase diagram for this system has been drawn up, from which it should be possible to read off the properties of any Ti-O alloy. The results amplify, confirm and in some details correct recent American work on the same system. A partial study of the system titanium-aluminium-oxygen up to about 1,200°C is in progress. Difficulty has been experienced in controlling the nitrogen content of some of the alloys, and unsatisfactory features have been revealed in the current methods of determining nitrogen in titanium alloys. In view of the importance of nitrogen in relation to the mechanical properties of titanium alloys, this matter will call for more attention.

The properties of the α-phase of the titanium-aluminium system have been further investigated, but the conclusion appears to be that a ductile alloy of high elastic modulus is unlikely to be developed. Some improvement can be brought about by the replacement of aluminium by vanadium but the results are still not satisfactory and this branch of the investigation will be brought to an end.

The exothermic heats of alloying of titanium alloys have been determined by a new design of calorimeter, in which powder mixtures of metals are heated by a small furnace. The input of electric energy is measured accurately and the electric heating is simultaneously used for calibration.

The calorimeter was checked against iron-aluminum mixtures, the heats of alloying for which are known. A second calorimeter has been designed for determining endothermic heats of alloying.

Some exploratory work has been done on the physical chemistry of the electrolytic process for producing titanium and some very satisfactory samples have been produced.

The chemistry section of the Metallurgy Division is concerned mainly with analysis. A procedure for a British Standard scheme for standardised metallurgical samples has been elaborated and a first trial is in progress. The NPL is to serve as an independent inspector.

Considerable work has been done in co-operation with BISRA. This includes a survey of methods for the determination of impurities in silicon-iron alloys for transformers, and the determination of nitrogen in alloys, especially at low concentration levels.

To overcome difficulties in obtaining supplies of iron of very low sulphur content, experiments have been started on the re-electrolysis in chloride solution of a high-purity electrolytic iron of Norwegian origin. It is hoped to produce iron containing less than 0.001 per cent of sulphur.

New Timber Preservative

Vacuum/Pressure Impregnation

THE introduction of a new waterborne general purpose timber preservative is announced by Hickson's Timber Impregnation Co. (GB) Ltd. This will be known as Hickson's 'Tanalith' C and will be applied to timber by vacuum/pressure impregnation. It will be a valuable addition to the Hickson range of preservatives and will complement their well-known 'Tanalith' U which the company claims has, outstandingly, the widest usages of any waterborne preservative throughout the world.

Work on its formulation, application to timber, laboratory tests and field tests have been proceeding for some years and when it comes into general use the efficiency of 'Tanalith' C will have been proved beyond question.

This preservative is already in production and is in bulk use at some timber treatment depots. When the new manufacturing plant, now in course of erection at Castleford is completed, 'Tanalith' C will be available for use to any licensed user of Hickson's processes, under their new patent application.

The most striking feature of the new product is its high fixation—higher than any other commercial waterborne preservative on the market, and comparable with Creosote. 'Tanalith' C was formulated primarily to inhibit the attack of the recently discovered 'soft rot fungi' which causes breakdown of wet timber and timber in the ground. In addition the new preservative gives full protection against white and brown rots, wood destroying borers and termites and, consequently, it can be used for the preservation of any timber where 'Tanalith' U is now employed.

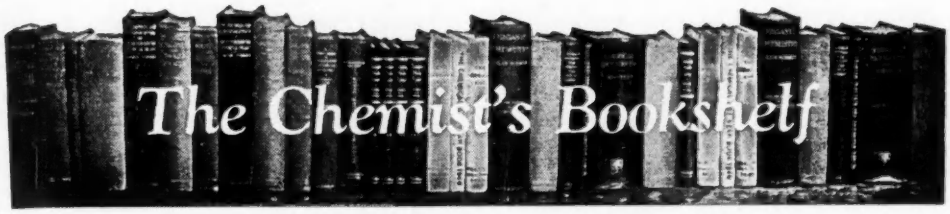
'Tanalith' C is particularly suitable for cooling tower work and timbers in sea water.

Warning to Industrialists

SPEAKING at the Federation of British Industries' Eastern Region annual luncheon at Cambridge last week, Sir Norman Kipping, director-general of the FBI, warned industrialists that a serious situation would arise if the Government did not revise the policy of deferment of industrial labour in line with such occupations as coal mining. The shortage of scientific man-power in Britain to-day was the bottleneck of potential export power and consequently our potential ability to compete against rival countries. Industry, said Sir Norman, picked up only three or four per cent of the 'high class' minds trained at universities. Whereas Britain was turning out about 6,000 students a year, the US figure was 60,000.

UK to Build 12 Atomic Power Stations

In a speech last week-end Sir Anthony Eden said that many UK companies were exploring markets overseas for their new atomic power industry. 'We shall be able to promote an entirely new export trade. The scope is immense. Throughout the Commonwealth and Empire alone, for instance, wide areas are hungry for power. Nuclear energy is clearly going to be an important way of raising living standards in these areas.' The Prime Minister pointed out that within two years the first power station producing nuclear energy would be working, and in all, 12 such stations were planned.



RADIANT HEATING. By R. W. Shoemaker. McGraw-Hill Publishing Co. Ltd., New York & London. 2nd edition. 1954. Pp: x + 346. 50s.

The term radiant heating is used in this country to cover a variety of heating processes in which the transfer of heat is mainly by the mechanism of radiation. It is often used to describe the 'infra-red heating' process for the stoving of paints containing synthetic resins. This book, however, does not deal with the latter type of industrial process but is confined to a description of forms of central heating in which pipes or tubes carrying hot water, or in some cases electric heating panels, are embedded in the floors, walls or ceilings of buildings. If required the same system of pipes or tubes can also be used for cooling provided that care is taken to avoid the condensation which occurs if wall surfaces are cooled below the dew point. Radiant cooling as produced by circulating cold water through such a system cannot fully take the place of conventional air conditioning because of the difficulty with condensation. The advantages of radiant heating over conventional systems of central heating using radiators are made clear in this book and it is pointed out that the total cost is no higher while the operating costs are 20-30 per cent lower. It is interesting to read that a well-known English firm were the first to make practical radiant heating installations as far back as 1888.

The first four chapters cover the general principles of the method and numerous applications are illustrated. The radiant heating plant is described in Chapter V, which includes a consideration of the types of boiler used, including the so-called 'packaged type', and heat exchangers are also briefly dealt with. Automatic control systems for radiant heating are illustrated in Chapter VI, while the planning and empirical design of installations is covered in the next chapter. The installation of radiant heating systems, radiant cooling and the application of heat-pumps are all considered in later chapters, together with the use of electric heating conductors and panels. Although the transfer of heat is no longer by radiation, heating by buried pipes has been applied to swimming pools and to the melting of snow on road surfaces. The final chapter gives a more mathematical and theoretical treatment of design methods.

This book, apart from the last chapter, presents a semi-technical treatment of the subject which should be of considerable interest to architects, builders and heating engineers. Those concerned with the planning or design of new laboratories and similar premises will also find it of interest. The book is profusely illustrated; some of the illustrations, although adding interest to the book, only present views of the exteriors of buildings which incorporate radiant heating in their construction.—R.L.

THE STRUCTURAL RELATIONS OF NATURAL PRODUCTS. By Robert Robinson. Oxford University Press. 1955. Pp. xi + 150. 25s.

One of the most alarming initial aspects of organic chemistry is the immense and diverse range of compounds which occur naturally in plants and animals. It is natural to speculate on the manner in which these frequently complex molecules are elaborated in the living cell, and even more natural for the organic chemist, when doing so, to invoke his familiar laboratory synthetic reactions. This frequently arouses the wrath of biologists who tend to dismiss such reaction schemes as arid intellectual exercises completely disconnected with the facts of life.

In this transcript of the first Weizmann Memorial Lectures, Sir Robert Robinson, one of the founders of the biosynthetic approach, is careful to point out that the pro-

posed schemes merely correlate the structural frameworks of natural products and make no claim to give any 'information about the details of the mechanisms of biosynthetic reactions'. There can be no doubt, however, of the fruitfulness of the postulates described. By their use relationships between apparently unconnected structures spring to light, and the power of the method is well illustrated by its prediction of undiscovered compounds which, on consequent investigation, have actually been unearthed. Many of the ideas described here are receiving support from recent results obtained by the use of tracer elements.

The first lecture deals mainly with the building up of aliphatic and carbocyclic structures and the derivation therefrom of certain simple heterocyclic structures. The second and third lectures enlarge on heterocyclic biogenesis as exemplified by the numerous members of the alkaloid family. The way in which diversified structures of this complexity may be unified by these basic concepts makes fascinating reading. Every page of this book contains a stimulating idea and the whole constitutes an intellectual treat for organic chemists and even-tempered biologists.—R.A.R.

SURFACE COATINGS AND FINISHES. By Phillip L. Gordon and George J. Dolgin. Chemical Publishing Co., New York. 1954. Pp. 299. $9.00.

In their introduction the authors state that their purpose in writing this book is to review briefly orthodox varnish techniques and to describe in detail the plastic materials now available for surface coatings. Unfortunately, there is no serious attempt made to classify surface-coating materials, and the unqualified use of the word 'plastic' in this field is deplored.

In the first chapter, which deals with oleoresinous varnishes, the naturally-occurring resins are described followed by the rosin derivatives, and finally the true, synthetic, varnish-resins such as phenol formaldehyde condensation products, terpene resins, etc. The remainder of this chapter deals very cursorily, but adequately, with the more usual varnish oils, driers and thinners and some attention is paid to varnish cooking; formulations for specimen short-, medium- and long-oil types being given.

Chapter 2 deals with surface coatings based on synthetic resins and polymers and serves to introduce the subject matter discussed in more detail in the remainder of the book. This chapter describes the place found by alkyds, phenolics and amino resins, cellulosics, hydrocarbons and rubber-based materials in modern surface-coating technology.

In Chapter 3 the authors have succeeded in compiling in little space a very useful and balanced account of the alkyd resins. Urea and melamine resins are dealt with in a single chapter, and it is disappointing to discover that there has been little advance made in the theory of the formation and behaviour of amino resins since the classical work of Hodgins and Hovey. This chapter, like others, concludes with a number of typical paint formulae based on urea and melamine resins.

The chapter on cellulose derivatives includes an account of nitrocellulose, cellulose acetate, the mixed esters of cellulose and its methyl-, ethyl-, and benzyl-ethers.

The heading 'Synthetic High Polymers" embraces a rather heterogeneous selection of materials including polyvinyl acetate, chloride/acetate and chloride, polyvinyl butyral, polyvinyl acetate/maleate, the polymeric methacrylic acid esters, polystyrene, the so-called styrenated oils and alkyd resins, the copolymers of styrene and vinyl toluene with butadiene and finally polyvinylidene chloride. It is, of course, quite impossible to furnish very much detail in as little as 40 pages, but the authors have succeeded in conveying a comprehensible account of these materials, at least to the reader already possessing some knowledge of the surface-coating industry.

Chapter 8 deals with rubber-based materials, Chapter 9 with miscellaneous plastics, and Chapter 10 with testing methods. Miscellaneous plastics include such diverse materials as sulphonamide resins and Zein and it is here also that reference to the epoxide resins can be found.

The authors have attempted to furnish within 300 pages useful theoretical and practical information dealing with virtually all of the raw materials being used to-day in the surface coating industry and they are to be congratulated on the result. This book, which is well referenced, should find a welcome place on the shelves of all connected with the surface-coating industry in any of its many aspects.—G. SWANN.

HOME

Vitreous Enamel Congress

The Institute of Vitreous Enamellers are to hold an international congress on vitreous enamelling on 9 October. The congress will have its main centre at Leamington Spa and will continue until 21 October.

Anglo-French Atomic Agreement

The United Kingdom Atomic Energy Authority and the French Atomic Energy Commission have recently concluded an agreement for the exchange of unclassified information between the two organisations on a range of subjects. The purpose of the agreement is to promote and develop the peaceful uses of atomic energy in the two countries in conformity with the movement for international co-operation.

New Bakelite Film

A press showing of their new educational film, 'To Shape Tomorrow', was staged by Bakelite Limited at the National Film Theatre, South Bank, London, on 20 May. The film is designed to show the extent to which the public have come to rely upon plastics for things which are used every day. At times amusing, always entertaining, the film is exceptionally well produced. The acting and commentary are excellent and the photography good. It runs for 27 minutes and is available in 35 mm. and 16 mm. Eastman Colour prints. Applications for the loan of prints should be made to Bakelite Limited (Publicity Department), 12-18 Grosvenor Gardens, London S.W.1.

Anglesey to Conduct Fluorine Tests

Anglesey is to conduct tests to determine the effects of fluorine on the teeth of school children. Water for one part of the county will be treated with fluorine at the rate of one part per million; in another district it will remain untreated.

More Publicity for Fertilisers

The Fertiliser Manufacturers' Association announce that the publicity and public relations activities initiated three years ago, in conjunction with the Superphosphate Manufacturers' Association, are to be extended. In future the Fertiliser Manufacturers' Association will be responsible for this work and will be supported by bodies representing producers of basic slag, nitrogen, potash and superphosphate.

Duke Visits Research Laboratory

The Duke of Edinburgh visited the British Non-Ferrous Metals Research Association's laboratory in Euston Street, London, last Monday. The royal visit marked the 25th anniversary of the establishment.

Latex Foam Booming

The latex foam industry, born in the laboratories at Fort Dunlop in 1928, now ranks almost second in importance to the tyre industry as a consumer of rubber in the United States and Great Britain, Mr. E. A. Murphy, M.Sc., F.R.I.C. F.I.R.I., one of the inventors of latex foam rubber, told the Institution of the Rubber Industry at Birmingham University on 20 May. In 1953, he said, it had a total annual value of £80,000,000.

Cambridge Instrument Co. 'At Home'

The Cambridge Instrument Company entertained members of Cambridge University at an 'At Home' on 4 and 5 May. About 600 people accepted the invitation and were able to visit the factory and research departments.

Urges More Scientists for Survival

Presenting the annual report at the two-day conference of Professional Civil Servants which opened at Westminster on Monday, 22 May, Mr. Stanley Mayne referred to problems created by the shortage of scientists and technologists. 'We are in the closing stages of an election campaign, but is there any indication in the programmes of either of the two major parties that they realise the supply of scientific and technological labour is a major problem in survival?' he asked.

Impending Crisis in Fuel Supplies

In his presidential address at the conference of the Association of Scientific Workers in London, Professor D. M. Newitt, Professor of Chemical Engineering at the Imperial College in London, forecast a continual state of crisis within the next few years in this country's fuel supplies. Industries were changing from coal to oil and there were signs that the domestic energy load would follow the same path. Despite large capital expenditure for the coal, gas and electricity industries, supply had fallen behind demand.

• OVERSEAS •

NZ Studies New Japanese Fertiliser

Three New Zealand agricultural experts have gone to Japan to investigate a new type of phosphate manure. The delegation went at the request of the Southland Fertiliser Company and the New Zealand Meat Producers' Board.

Parke-Davis Hurry New Plant

Parke-Davis & Co. Ltd. are to build a pharmaceutical manufacturing laboratory on a 25-acre site at Brockville, Ontario. It will replace the company's plant at Windsor, Ontario, and will be completed by the middle of next year.

US Develops New Heavy Gauge Tinplate

A heavy gauge electrically-coated tinplate is now being produced in the US for car and radio parts, Dr. W. E. Hoare, assistant director of The Tin Research Institute, said at a recent conference in Utrecht, Holland. It will be used in the US to replace terne-plate, aluminium, zinc-coated sheets and other metals of higher cost.

US Atom Secrets for Industry

The US Atomic Energy Commission has proposed rules to allow US businessmen to have information to develop atomic energy for civilian use. The aim is to expand the use of the atom in industry and medical treatment. Applicants for this information will be required to show need for it, and would have access for a limited time.

Atomic Energy for Free Asia

In a recent speech in Tokyo, Mr. J. J. Hopkins, an American industrialist, urged that an 'Atomic Energy Community for Free Asia' be formed after the style of the European Coal & Steel Community.

French to Build Brazilian Oil Plant

Petrobras, the joint Brazilian company, has concluded an agreement with four French engineering concerns for the construction of a large plant to produce greasing oils inside the Mataripe refinery in Bahia State. The contract, valued at more than £3,061,000, was awarded to the following companies: Batignoiles-Chatillen, Fives-Lille, Societe des Forges et Ateliers du Creusot, and Compagnie Industrielle de Travaux.

West Australian Petroleum

West Australian Petroleum Proprietary, which is carrying out a search for oil in West Australia, has increased its authorised capital from £A1,000,000 to £A3,000,000. The California Texas Corporation holds 80 per cent of the issued capital, and Ampol Exploration the remainder.

Pig-Iron Experiments

Pig-iron may be produced as a by-product of the diversified operations of Consolidated Mining & Smelting Co. of Canada, owner of the world's largest lead-zinc mines. Experiments have been conducted at the company's Trail, BC, plant and at the federal laboratories at Ottawa.

Oil Refinery for Greece

A contract for the construction of an oil refinery in Greece was signed in Athens on 9 May between the Greek Government and the German firms of Hydrocarbon, Krupps and Stahlunion. The refinery, which will be situated at Aspropyrgos (near Athens), will have a capacity of 1,300,000 tons per annum.

Canadian Yeast Plant Sold

The sale of the Best Yeast plant at Liverpool, Nova Scotia, to Standard Brands Limited, of Montreal, has been announced. President David Wallace, of Standard Brands, said: 'Production would be increased with transfer of some operations from a plant at Lasalle, Quebec.' The Best Yeast plant, founded in 1935, produced yeast by using sugars obtained from waste sulphite at the nearby Mersey paper plant.

Turkey Steps up Sugar Output

In Turkey, three new sugar refineries are scheduled to begin production in August. Four others will be built by 1956. Turkey's production has risen from 130,000 tons in 1950 to 223,000 tons last year.

Rayflor Plant for Canada

A $1,000,000 silvi-chemical plant will be constructed by Alaska Pine and Cellulose Co. in Vancouver's Marpole district. The plant will be completed at the end of this year and will go into production early in 1956. It will make rayflor from hemlock bark. It will be the first of its kind in the world to go into commercial production.

· PERSONAL ·

At the first AGM of the SCI Pesticides Group at the Chemical Society's Rooms in London recently, the following committee members were elected: *chairman*, DR. R. A. E. GALLEY; *vice-chairman*, DR. F. P. COYNE; *hon. treasurer*, MR. H. W. READ; *hon. recorder*, DR. E. E. TURTLE; *hon. secretary*, MR. G. L. BALDIT; DR. J. ALLEN, DR. R. DE B. ASHWORTH, DR. J. R. BOOER, DR. J. K. EATON, DR. A. B. P. PAGE, MR. N. K. SMITH.

DR. E. W. RUSSELL, Reader in Soil Science at the department of agriculture, Oxford University, has been appointed Director, East African Agriculture & Forestry Research Organisation. He is expected to take up his duties in October.

At a meeting of the University Council of the University of Leeds on 18 May, MR. E. R. CLARK was appointed lecturer in pharmacological chemistry.

After 33 years on the commercial side of the Clayton Aniline Co. Ltd., Manchester, MR. G. H. CARNALL succeeds MR. T. M. WILLCOX as managing director, and also becomes a director of the associate company, Clayton Dyestuffs. Mr. Willcox becomes vice-chairman of both companies. Other appointments are DR. A. BRUNNER and DR. F. FEHLMANN as directors of Clayton Aniline Co. MR. A. E. PEAK remains as chairman.

The Association of British Insecticide Manufacturers has elected the following officers for the year 1955/56: *chairman*, MR. F. W. SUGDEN (Plant Protection Ltd.); *vice-chairman*, DR. J. R. BOOER (F. W. Berk & Co.); *hon. treasurer*, MR. H. J. JONES (Hemingway & Co. Ltd.); *hon. auditor*, MR. N. B. TAYLOR (Hickson & Welch Ltd.). *Executive Committee*: MR. E. T. BUGGE (Bugges Insecticides Ltd.), MR. R. W. CRAVEN (W. J. Craven & Co. Ltd.), MR. A. T. DAVEY (Burt, Boulton & Haywood Ltd.), MR. M. N. GLADSTONE (Fisons Pest Control Ltd.), MR. A. G. HOY (British Nicotine Co. Ltd.), MR. H. G. HUCKLE (Shell Chemicals Ltd.), MR. H. C. MELLOR (Bayer Agriculture Ltd.), MR. A. G. PONTON (Pan Britannica Industries Ltd.), MR. R. C. STOTTER (Plant Protection Ltd.). *Ex officio*: MR. N. K. SMITH (The Murphy Chemical Co. Ltd.). *Hon vice-chairman*: MR. H. J. Jones.

SIR CLAUDE GIBB, chairman of A. Reyrolle & Co., and chairman and managing director of C. A. Parsons & Co., is president of the Nuclear Power Plant Co. which has been registered with a capital of £1,000,000 in £1 shares for the design, construction and development of nuclear power plants and works. Other directors are MR. H. H. MULLENS, who is managing director of A. Reyrolle & Co., and MR. A. T. BOWDEN.

At the annual general meeting of the Institute of Physics held on 17 May, SIR JOHN COCKCROFT, director of the Atomic Energy Research Establishment, Harwell, was re-elected president. DR. W. H. TAYLOR, vice-president, DR. S. WHITEHEAD, honorary treasurer, and DR. B. P. DUDDING re-elected honorary secretary were others elected. Three new ordinary members elected were: DR. M. R. HOPKINS, DR. J. M. A. LENIHAN and DR. J. TAYLOR.

The Mond Nickel Co. Ltd. announces the following managerial changes effective from 19 May: MR. L. K. BRINDLEY, M.B.E., deputy chairman of the Mond Nickel and Henry Wiggin companies. MR. G. ARCHER, C.M.G., managing director of the Mond Nickel Co. MR. R. A. R. HILL, director of Mond Nickel Co., and comptroller of both Mond Nickel Co. and Henry Wiggin & Co. MR. F. B. HOWARD-WHITE, director of Henry Wiggin & Co., and secretary of both Mond Nickel Co. and Henry Wiggin & Co. MR. J. O. HITCHCOCK, director of Mond Nickel Co., and sales director. MR. I. A. BAILEY moves from Birmingham to London and continues as a director of the Mond Nickel Co., and managing director of Henry Wiggin & Co. MR. F. DICKINSON, manager of the development and research department. MR. A. P. HAGUE continues as a director of Mond Nickel and Henry Wiggin & Co., and DR. A. G. RAMSAY, director of Mond Nickel, resident in Wales. DR. L. B. PFEIL, O.B.E., F.R.S., has relinquished the managership of the development and research department to give more time to the directorship.

British Chemical Prices

(These prices are checked with the manufacturers, but it must be pointed out that in many cases there are variations according to quantity, quality, place of delivery, etc.)

LONDON.—There has been a steady movement in the various sections of the chemicals market during the past week and contract delivery specifications for the chief consuming industries have covered good volumes. New business on home account remains good and there has been no apparent election influence on forward bookings. A steady flow of orders for shipment has been reported. Prices throughout the market are steady with quotations unchanged at recent levels. The coal tar products market is again without feature with supplies of most items already covered by former contracts.

MANCHESTER.—Steady trading conditions have been experienced in most sections of the Manchester market for heavy chemical products during the past week. Leading industrial users continue to specify for good contract deliveries of the soda, potash and ammonia compounds, as well as a wide range of other heavy chemicals, and a fair volume of replacement business is coming on to market. Few price changes of any consequence have occurred since last report. Some of the fertilisers, including sulphate of ammonia, are still being taken up in fair quantities, and a steady trade is passing in most of the tar products.

GLASGOW.—A quieter position prevailed in the Scottish market for industrial chemicals. Little or no change has to be reported in prices. The demand for agricultural chemicals is still fairly active and the export market still continues satisfactorily.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 10 tons, £83 ; 80% pure, 10 tons, £89 ; commercial glacial, 10 tons, £91 ; delivered buyers' premises in returnable barrels (technical acid barrels free) ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £123 per ton.

Alum.—Ground, about £23 per ton, f.o.r. MANCHESTER : Ground, £25.

Aluminium Sulphate.—Ex works, £14 15s. per ton d/d. MANCHESTER : £14 10s. to £17 15s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—2-cwt. non-returnable drums : 1-ton lots, £49 per ton.

Ammonium Chloride.—Per ton lot, in non-returnable packaging, £27 17s. 6d.

Ammonium Nitrate.—D/d, £31 per ton (in 4-ton lots).

Ammonium Persulphate. — MANCHESTER : £6 5s. per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £97 and £94 10s. per ton.

Antimony Sulphide.—Crimson, 4s. 4d. to 4s. 9½d. ; golden, 2s. 7½d. to 4s. 0¾d. ; all per lb., delivered UK in minimum 1-ton lots.

Arsenic.—Per ton, £45 to £50 ex store.

Barium Carbonate.—Precip., d/d : 4-ton lots, £39 per ton ; 2-ton lots, £39 10s. per ton, bag packing.

Barium Chloride.—£42 15s. per ton in 2-ton lots.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £42 10s. per ton d/d ; 2-ton lots, £43 per ton d/d.

Bleaching Powder.—£27 17s. 6d. per ton in returnable casks, carriage paid station, in 4-ton lots.

Borax.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, anhydrous, £60; granular, £40 ; crystal, £42 10s. ; powder, £43 10s. ; extra fine powder, £44 10s. ; BP, granular, £49 ; crystal, £51 10s. ; powder, £52 10s. ; extra fine powder, £53 10s.

Boric Acid.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, granular, £68 10s. ; crystal, £76 10s. ; powder, £74; extra fine powder, £76; BP granular, £81 10s. ; crystal, £88 10s. ; powder, £86 ; extra fine powder, £88.

Calcium Chloride.—Per ton lots, in non-returnable packaging : solid, £15 ; flake, £16.

Chlorine, Liquid.—£36 7s. 6d. per ton, in returnable 16-17-cwt. drums, delivered address in 3-drum lots.

Chromic Acid.—2s. 0⅜d. per lb., less 2½%, d/d UK, in 1-ton lots.

Chromium Sulphate, Basic.—Crystals, 7⅞d. per lb. delivered (£70 per ton).

Citric Acid.—1-cwt. lots, £10 5s. cwt. ; 5-cwt. lots, £10 cwt.

Cobalt Oxide.—Black, delivered, bulk quantities, 13s. 2d. per lb.

Copper Carbonate.—2s. 9d. per lb.

Copper Sulphate.—£101 per ton f.o.b., less 2% in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £10 12s.

Formaldehyde.—£37 5s. per ton in casks, d/d.

Formic Acid.—85%, £86 10s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G., £13 3s. 6d. to £13 14s. 6d. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hydrochloric Acid.—Spot, about 12s. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. 3d. to 1s. 6d. per lb.

Hydrogen Peroxide.—27.5% wt. £124 10s. per ton. 35% wt. £153 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 17s. 7d. per lb., in 28-lb. lots.

Iodoform.—£1 6s. 7d. per lb., in 28-lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight £122 per ton ; dark tech., 44 per cent by weight, £73 per ton ex-works ; chemical quality, 44 per cent by weight, £112 per ton, ex-works ; 1-ton lots, usual container terms.

Lead Acetate.—White : About £147 to £149 per ton.

Lead Nitrate.—About £128, 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red, £132 5s. ; orange lead, £144 5s. Ground in oil : red, £150 ; orange, £162.

Lead, White.—Basis prices : Dry English in 5-cwt. casks, £137 10s. per ton. Ground in oil : English, 1-cwt. lots, 178s. per cwt.

Lime Acetate.—Brown, ton lots, d/d, £40 per ton ; grey, 80-82%, ton lots, d/d, £45 per ton.

Litharge.—£134 5s. per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex-works, about £28 per ton.

Magnesium Carbonate.—Light, commercial, d/d, 2-ton lots, £84 10s. per ton, under 2 tons, £92 per ton.

Magnesium Chloride.—Solid (ex-wharf), £14 per ton.

Magnesium Oxide.—Light, commercial, d/d, under 1-ton lots, £245 per ton.

Magnesium Sulphate.—Crystals, £15 per ton.

Mercuric Chloride.—Technical Powder, £1 8s. 9d. per lb., in 5-cwt. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—£1 11s. 3d. per lb., for 5-cwt. lots.

Nickel Sulphate.—D/d, buyers UK £170 per ton. Nominal.

Nitric Acid.—80° Tw., £35 per ton.

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, about £131 per ton, carriage paid.

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £92 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.

Potash, Caustic.—Solid, £93 10s. per ton for 1-ton lots ; Liquid, £36 5s.

Potassium Carbonate. — Calcined, 96/98%, about £63 per ton for 1-ton lots, ex-store.

Potassium Chloride.—Industrial, 96%, 1-ton lots, about £24 per ton.

Potassium Dichromate.—Crystals and granular, 1s. 1d. per lb., in 1-ton lots, d/d UK.

Potassium Iodide.—B.P., 14s. 1d. per lb. in 28-lb. lots ; 13s. 7d. in cwt. lots.

Potassium Nitrate.—In 4-ton lots, in non-returnable packaging, paid address, £63 10s. per ton.

Potassium Permanganate.—BP, 1-cwt. lots, 1s. 9d. per lb. ; 3-cwt. lots, 1s. 8½d. per lb. ; 5-cwt. lots, 1s. 8d. per lb. ; 1-ton lots, 1s. 7¾d. per lb. ; 5-ton lots, 1s. 7¼d. per lb. ; Tech., 5-cwt. packed in 1-cwt. drums, £8 14s. 6d. per cwt. ; packed in 1 drum, £8 9s. 6d. per cwt.

Salammoniac.—Per ton lot, in non-returnable packaging, £45 10s.

Salicylic Acid. — MANCHESTER : Technical 2s. 7½d. per lb. d/d.

Soda Ash.—58% ex-depot or d/d, London station, about £15 5s. 6d. per ton, 1-ton lots.

Soda, Caustic.—Solid 76/77% ; spot, £26 to £28 per ton d/d (4 ton lots).

Sodium Acetate.—Commercial crystals, £91 per ton d/d.

Sodium Bicarbonate.—Per ton lot, in non-returnable packaging, £15 10s.

Sodium Bisulphite. — Powder, 60/62%, £41 to £43 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—Per ton lot, in non-returnable packaging, paid address, £59 5s.

Sodium Chlorate.—About £75 per ton in free 1-cwt. drums, carriage paid station, in 4-ton lots.

Sodium Cyanide.—96/98%, £113 5s. per ton lot in 1-cwt. drums.

Sodium Dichromate.—Crystals, cake and powder, 10¾d. per lb. Net d/d UK, minimum 1-ton lots; anhydrous, 1s. 0¼d. per lb. Net del. d/d UK, minimum 1-ton lots.

Sodium Fluoride.—Delivered, 1-ton lots and over, £4 15s. per cwt.; 1-cwt. lots, £5 5s. per cwt.

Sodium Hyposulphite.—Pea crystals £34 a ton; commercial, 1-ton lots, £30 15s. per ton, carriage paid.

Sodium Iodide.—BP, 17s. 1d. per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £127 per ton.

Sodium Metasilicate.—£24 per ton, d/d UK in ton lots, loaned bags.

Sodium Nitrate.—Chilean Industrial, over 98% 6-ton lots, d/d station, £27 10s.

Sodium Nitrite.—£32 per ton (4-ton lots).

Sodium Percarbonate.—12½% available oxygen, £8 2s. 10½d. per cwt. in 1-cwt. drums.

Sodium Phosphate.—Per ton d/d for ton lots: Di-sodium, crystalline, £37 10s., anhydrous, £81; tri-sodium, crystalline, £39 10s., anhydrous, £79.

Sodium Silicate.—75-84° Tw. Lancashire and Cheshire, 4-ton lots, d/d station in loaned drums, £10 15s. per ton; Dorset, Somerset and Devon, £3 17s. 6d. per ton extra; Scotland and S. Wales, £3 per ton extra. Elsewhere in England, excluding Cornwall, and Wales, £1 12s. 6d. per ton extra.

Sodium Sulphate (Glauber's Salt).—About £8 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER: £6 10s. per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot, £33 2s. 6d. per ton, d/d, in drums; broken, £33 2s. 6d. per ton, d/d, in drums.

Sodium Sulphite.—Anhydrous, £59 per ton; pea crystals, £37 12s. 6d. per ton d/d station in kegs; commercial, £23 7s. 6d. per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £20 to £22, according to fineness.

Sulphuric Acid.—Net, naked at works, 168° Tw. according to quality, per ton, £10 7s. 6d. to £12; 140° Tw., arsenic free, per ton, £8 12s. 6d.; 140° Tw., arsenious, per ton, £8 4s. 6d.

Tartaric Acid.—Per cwt.: 10 cwt. or more, £12 10s.

Titanium Oxide.—Standard grade comm., with rutile structure, £162 per ton; standard grade comm., £142 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d, white seal, £107; green seal, £105; red seal, 2-ton lots, £103 per ton.

Solvents & Plasticisers

Acetone.—Small lots: In 5-gal. cans: 5-gal., £125 10-gal. and upward, £115, cans included. In 40/45 gal. returnable drums, spot: Less than 1 ton, £90; 1 to less than 5 tons, £87; 5 to less than 10 tons, £86; 10 tons and upward, £85. In tank wagons, spot: 1 to less than 5 tons (min. 400 gal.), £85; 5 to less than 10 tons (1,500 gal.), £84; 10 tons and upward (2,500 gal.), £83; contract rebate, £2. All per ton d/d.

Butyl Acetate BSS.—£169 per ton, in 1-ton lots; £167 per ton, in 10-ton lots.

***n*-Butyl alcohol, BSS.**—10 tons, in drums, £154 per ton d/d.

***sec*-Butyl Alcohol.**—5 gal. drums £159; 40 gal. drums: less than 1 ton £124 per ton; 1 to 10 tons £123 per ton; 10 tons and over £122 per ton; 100 tons and over £120 per ton.

***tert*-Butyl Alcohol.**—5 gal. drums £195 10s. per ton; 40/45 gal. drums: less than 1 ton £175 10s. per ton; 1 to 5 tons £174 10s. per ton; 5 to 10 tons, £173 10s.; 10 tons and over £172 10s.

Diacetone Alcohol.—Small lots: 5 gal. drums, £177 per ton; 10 gal. drums, £167 per ton. In 40/45 gal. drums; less than 1 ton, £142 per ton; 1 to 9 tons, £141 per ton; 10 to 50 tons, £140 per ton; 50 to 100 tons, £139 per ton; 100 tons and over, £138 per ton.

Dibutyl Phthalate.—In drums, 10 tons, 2s. per lb. d/d; 45 gal. drums, 2s. ¾d. per lb. d/d.

Diethyl Phthalate.—In drums, 10 tons, 1s. 10½d. per lb. d/d; 45 gal. drums, 1s. 11¾d. per lb. d/d.

Dimethyl Phthalate.—In drums, 10 tons, 1s. 7¾d. per lb. d/d; 45 gal. drums, 1s. 8¾d. per lb. d/d.

Dioctyl Phthalate.—In drums, 10 tons, 2s. 8d. per lb. d/d; 45 gal. drums, 2s. 9½d. per lb. d/d.

Ether BSS.—In 1 ton lots, 1s. 11d. per lb.; drums extra.

Ethyl Acetate.—10 tons lots, d/d, £133 per ton.

Fine Chemicals Division of

ALBRIGHT & WILSON

formerly Thomas Tyrer & Co. Ltd.

For many years Thomas Tyrer & Co. Ltd., a subsidiary company of Albright & Wilson Ltd., traded as a separate entity, manufacturing and selling a wide range of fine chemicals. In order to secure the utmost benefit from the group's research facilities and selling organisation Thomas Tyrer & Co. Ltd. has now been absorbed into the parent company. The manufacture of Sterling Brand fine chemicals will continue at Stratford. The sales organisation is now at 49 Park Lane, London, W.1, and forms the Fine Chemicals Division of Albright & Wilson Ltd.

*

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include: SULPHAMIC ACID & SULPHAMATES · NAPHTHENATES STEARATES · CITRATES · FLUOBORATES · SALTS OF COBALT, NICKEL, MANGANESE, LEAD, BISMUTH, CADMIUM & STRONTIUM

ALBRIGHT & WILSON

Fine Chemicals Division

49 PARK LANE · LONDON · W1 · TELEPHONE: GROSVENOR 1311

Ethyl Alcohol (PBS 66 o.p.).—Over 300,000 p. gal., 2s. 9d. ; 2,500-10,000 p. gal., 2s. 11½d. per p. gal., d/d in tankers. D/d in 40/45-gal. drums, 1d. p.p.g. extra. Absolute alcohol (75.2 o.p.) 5d. p.p.g. extra.

Methanol.—Pure synthetic, d/d, £43 15s. per ton.

Methylated Spirit.—Industrial 66° o.p. : 500 gal. and over in tankers, 4s. 10d. per gal. d/d ; 100-499 gal. in drums, 5s. 2½d. per gal. d/d. Pyridinised 64 o.p. : 500 gal. and over in tankers, 5s. 0d. per gal. d/d ; 100-499 gal. in drums, 5s. 4½d. per gal. d/d.

Methyl Ethyl Ketone.—10-ton lots, £136 per ton d/d. ; 100-ton lots, £134 per ton d/d.

Methyl *iso*Butyl Ketone.—10 tons and over £167 per ton.

***iso*Propyl Acetate.**—In drums, 10 tons, £128 per ton d/d ; 45 gal. drums, £133 per ton d/d.

***iso*Propyl Alcohol.**—Small lots : 5-gal. drums, £118 per ton ; 10-gal. drums, £108 per ton ; in 40-45 gal. drums ; less than 1 ton, £83 per ton ; 1 to 9 tons £81 per ton ; 10 to 50 tons, £80 10s. per ton ; 50 tons and over, £80 per ton.

Rubber Chemicals

Carbon Bisulphide.—£61 to £67 per ton, according to quality.

Carbon Black.—8d. to 1s. per lb., according to packing.

Carbon Tetrachloride.—Ton lots, £76 10s. per ton.

India-Rubber Substitutes.—White, 1s. 5¾d. to 1s. 9½d. per lb. ; dark, 1s. 4d. to 1s. 6¾d. per lb. delivered free to customers' works.

Lithopone.—30%, about £54 per ton.

Mineral Black.—£7 10s. to £10 per ton.

Sulphur Chloride.—British, about £50 per ton.

Vegetable Lamp Black.—£64 8s. per ton in 2-ton lots.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton, in 6-ton lots, d/d farmers' nearest station : March to June, £18.

Compound Fertilisers.—Per ton in 6 ton lots, d/d farmer's nearest station, I.C.I. Special No. 1. January to June, £25 14s.

'Nitro-Chalk.'—£15 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots, d/d nearest station : May to June, £26 10s.

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals. delivered in bulk, 90's, 5s. ; pure, 5s. 4d.

Carbolic Acid.—Crystals, 1s. 4d. to 1s. 6¼d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 4½d. to 1s. 6¼d. per lb., d/d crude, 8s. naked, at works.

Creosote.—Home trade, 1s. to 1s. 6d. per gal., according to quality, f.o.r. maker's works. MANCHESTER : 1s. to 1s. 8d. per gal.

Cresylic Acid.—Pale 99/99½%, 5s. 7d. per gal. ; 99.5/100%, 5s. 9d. per gal. D/d UK in bulk : Pale A.D.F. from 5s. 8d., per Imperial gallon, f.o.b.

Naphtha.—Solvent, 90/160°, 4s. 10d. per gal. ; heavy, 90/190°, 3s. 9½d. per gal for bulk 1000-gal. lots, d/d. Drums extra ; higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in sellers' bags, £16 6s. to £23 per ton nominal, according to m.p. ; hot pressed, £40 per ton in bulk ex-works ; refined crystals, £54 per ton d/d.

Pitch.—Medium, soft, home trade, £8 10s. per ton f.o.r. suppliers' works ; export trade about £10 10s. per ton f.o.b. suppliers' port.

Pyridine.—90/160°, £1 5s. to £1 7s. 6d. per gal.

Toluole.—Pure, 5s. 7d. ; 90's, 4s. 10d. per gal. d/d. MANCHESTER : Pure, 5s. 7d. per gal. naked.

Xylole.—For 1000-gal. lots, 5s. 10d. to 6s. per gal., according to grade, d/d London area in bulk.

Intermediates & Dyes
(Prices Nominal)

***m*-Cresol 98/100%.**—4s. 3d. per lb. d/d.

***o*-Cresol 30/31° C.**—1s. 4d. per lb. d/d.

***p*-Cresol 34/35° C.**—4s. 3d. per lb. d/d.

Dichloraniline.—4s. 1d. per lb.

Dinitrobenzene.—88/89° C., 1s. 11d. per lb.

Dinitrotoluene.—S.P. 15° C., 1s. 11½d. per lb. ; S.P. 26° C., 1s. 3d. per lb. S.P. 33° C., 1s. 1½d. per lb. ; S.P. 66/68° C., 1s. 9d. per lb.

***p*-Nitraniline.**—4s. 7d. per lb.

Nitrobenzene.—Spot, 9½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—2s. per lb.

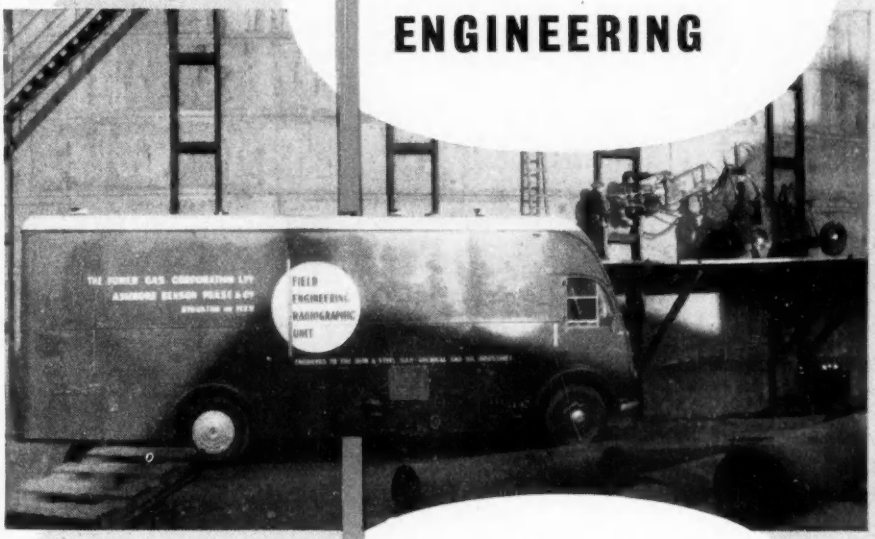
***o*-Toluidine.**—1s. 9d. per lb., in 8/10-cwt. drums, drums extra.

***p*-Toluidine.**—5s. 6d. per lb., in casks.

Dimethylaniline.—3s. 1d. per lb., drums extra, carriage paid.

LEADERS IN FIELD ENGINEERING

Radiographic inspection of Welds on the 3,000,000 cu. ft. all-welded Gasholder at Stockton-on-Tees, built by Ashmore, Benson, Pease & Co.



This self-contained mobile radiographic unit is able to travel to any site for the critical examination of welded vessels, pipework, structures, etc. Within a short time of the radiographic examination being completed the film can be processed in the unit's darkroom, dried and examined.
It makes available on hire, facilities to those sections of the engineering industry which find that the maintenance of a permanent radiographic department would not be an economic proposition. Write for decriptive brochure.

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THE POWER-GAS CORPORATION LIMITED
AND
ASHMORE, BENSON, PEASE & COMPANY
STOCKTON-ON-TEES AND LONDON
AUSTRALIA • CANADA • FRANCE • INDIA • SOUTH AFRICA

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

F. COLLINS LTD., Manchester, chemical merchants, etc.—1 April, charge, to Barclays Bank Ltd. securing all moneys due or to become due to the bank; charged on 9 Devonshire Road, St. Annes-on-Sea, and any rent charges, etc. Nil. 19 December, 1953.

Satisfactions

BRITISH CELANESE LTD., London W.—Satisfaction 6 April, of debenture stock registered 2 October, 1943 and 8 November, 1944, to the extent of £1,290.

E.V.B. PLASTICS LTD., Reigate.—Satisfaction 13 April, of debenture registered 1 September, 1953.

VANSUM PRODUCTS LTD., London W., plastic manufacturers, etc.—Satisfaction 13 April, of debenture registered 12 January, 1954.

Increases in Capital

The following increases in capital have been announced: COTTAGE LABORATORIES LTD., from £100 to £15,000; CROXDALE ENGINEERING DEVELOPMENT CO. LTD., from £1,000 to £10,000; ETHICON SUTURE LABORATORIES LTD., from £80,000 to £120,000; PHILIP HARRIS LTD., from £155,000 to £200,000; DORMAN LONG (CHEMICALS) LTD., from £950,000 to £1,000,000.

New Registrations

Kathleen Tomlinson Products Ltd.

Private company. (549,007.) Capital £100. Objects: To enter into an agreement with Kathleen Tomlinson, to take a licence to exploit the invention, the subject of a pending patent and of registered design No. 873,690, and to carry on the business of manufacturers and exporters of and dealers in goods and merchandise of all kinds, including chemical, surgical, pharmaceutical and textile goods, etc. The subscribers (each with one share) are: Henry H. Martin and Kenneth R. Coleman. Directors: Kathleen Tomlinson, Samuel F. Tomlinson, Sidney H. Cowan and Miriam Cowan.

Griffiths Hughes (Overseas) Ltd.

Private company. (548,760.) Capital £100. Chemists, druggists, drysalters, oil and colour men, etc. Directors: Cecil B. Green, Osman P. Marland and Frank Severn. Reg. office: 52 Peru Street, Adelphi, Salford.

J. Currie & Son Ltd.

Private company. (548,898.) Capital £3,000. Chemical engineers, makers of chemical plant and materials, lead workers and burners, etc. Directors: Walter Currie and Chas. M. Currie. Secretary: Betty Shepherd. Reg. office 14 Bristowe Street, Clayton, Manchester 11.

H. A. Cook (Holdings) Ltd.

Private company. (548,916.) Capital £100. Manufacturers of and dealers in chemicals, gases, drugs, medicines, gypsum, plasters, disinfectants, fertilisers, salts, acids, foodstuffs, oils, isinglass, paints, colours, glues, gums, pigments, etc. The subscribers (each with one share) are: Norman J. James and Wendy Hutchinson. Reg. office: 6 Hanover Square, W.1.

Farm Agricultural Botanical Produce Ltd.

Private company. (548,594.) Capital £100. Manufacturers of and dealers in agricultural and botanical products, chemicals, fertilising materials and insecticides, etc. Directors: Arnold E. M. Jansen, Roelof Van Ingen and Henry A. Jansen. Reg. office: 185 Heath Road, Twickenham, Mdx.

Company News

Cussons, Sons & Co. Ltd.

At the recent annual general meeting of Cussons, Sons, & Co., Ltd., at Kersal Vale, Manchester, Mr. Leslie Cussons, the chairman, said the company had maintained steady progress and both sales and profits had reached new high levels. On the export side restrictions and increased tariffs had

[continued on page 1214

Trouble with Precipitation?

Owing to its great tendency to form stable water-soluble complexes with heavy metal ions, Sequestrol (ethylene diamine tetra-acetic acid Geigy) can prevent the precipitation of many normally insoluble substances such as calcium carbonate, barium sulphate, etc., etc. For this reason it is of great value in eliminating incompatibilities in pharmaceuticals, preventing haze and sludge formation, controlling the effects of water hardness and many similar applications.

a pinch of
SEQUESTROL
may be the answer

THE GEIGY COMPANY LTD · Rhodes · Geigy Middleton · MANCHESTER
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Company News

continued from page 1212

led to a fall in the over-all export sales. Despite this, however, the current year's figures indicated a change for the better. The Company is to continue the overseas development programme outlined last year. The net profit this year at £159,698 after taxation shows an increase as against 1953 in the amount of £35,567, and after bringing in £41,595 from last year, gives a total of £201,293.

The directors recommended a transfer be made to the general reserve of £125,000 and that £30,938 be appropriated to pay a final dividend of 22½ per cent less tax, which together with the interim dividend of 15 per cent less tax makes a total for the year of 37½ per cent less tax. This compared with 35 per cent less tax last year and will leave £24,730 to be carried forward to 1955. At the extraordinary general meeting after the annual meeting, resolutions were passed increasing the capital of the Company to £500,000 by the issue of one 'A' ordinary share of 2s. for each ordinary stock unit of 2s. held.

Reichhold Chemicals

In his statement for 1954 on the accounts of Reichhold Chemicals, the chairman, Mr. W. H. Breuer, points out that instead of the 40½ per cent envisaged on the formation of the Company, ordinary shareholders will have received in respect of the three-year period to December 31, 1954, dividends and bonus amounting to 36 per cent. If nothing unforeseen occurs during the current year, the board intends to take into account the 4½ per cent which holders would have expected to receive. Trading and profits of the Company have been satisfactory, and it has been decided to build a plant for the manufacure of phthalic anhydride. It is hoped to start production in 1956. The group's net profits rose from £85,775 to £179,850 and the total distribution was 22½ per cent compared with 13½ per cent. Current assets have risen from £862,053 to £968,512 and liabilities from £359,215 to £426,527. The meeting will be at Winchester House, London EC, on 16 June at 12.30 p.m.

Boots Pure Drug Co. Ltd.

Boots Pure Drug Co. Ltd. announce they have received the permission of the Capital Issues Committee to issue 20,480,000 ordinary shares of 5s. each to the Company's ordinary shareholders in the proportion of one share for every one held by ordinary shareholders at the close of business on 14 July, 1955. It is proposed to do this by capitalising a total sum of £5,120,000 made up of £2,817,896 standing to the credit of the share premium account, £1,000,000 standing to the credit of the works development and contingencies account, and £1,302,104 out of the general reserve account. To enable this to be done it is proposed to increase the authorised capital of the company to £15,000,000. The purpose of the proposed capitalisation is to bring the issued capital more into line with the capital employed in the business. The necessary resolutions will be proposed at an extraordinary general meeting which will be held immediately following the annual general meeting at Boots Works Canteen, Beeston, Notts, on Thursday, 14 July.

Lanadron Rubber Estates

The directors of the Lanadron Rubber Estates have recommended a dividend of 10 per cent. A total of £133,185 is available for distribution, as compared with £73,873 in 1953. The replacement reserve has received £13,532 and £60,000 has been added to the capital general reserve. The AGM will be held in London on 13 June.

Next Week's Events

THURSDAY 2 JUNE

Chemical Society

London: The Rooms of the Chemical Society, Burlington House, Piccadilly, 7.30 p.m. Centenary lecture 'Chemical Effects of Steric Strains' by Professor H. C. Brown.

SCI (Plastics & Polymer Group)

London: Royal Institution, 21 Albemarle Street, W.1, 6 p.m. Baekeland Memorial lecture 'Leo Hendrik Baekeland & Photographic Printing Papers' by Dr. C. E. K. Mees.

FRIDAY 3 JUNE

SCI (Food & Agriculture Group)

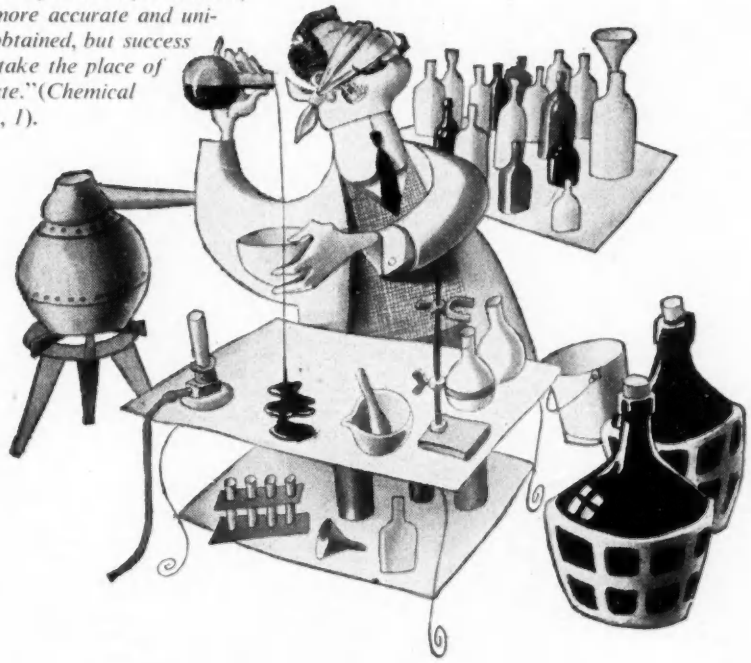
London: Start of foreign tour to Copenhagen (until 11 June).

SCI (Chemical Engineering Group)

London: Cafe Royal, Regent Street, W.1, 6.15 p.m. Annual meeting and dinner.

. . . . the unerring laws

"Chemical science during the last quarter of a century has made such extended progress that our arts and manufactures assume altogether a different aspect. Those chemical arts which formerly were rudely conducted by the system termed the 'rule of thumb' are now methodically organised and arranged in accordance with the unerring laws of chemistry . . . Hence, not only are more accurate and uniform results obtained, but success and economy take the place of failure and waste." (*Chemical News, 1859, 1, 1*).



Here, in the first number of 'Chemical News,' published nearly a hundred years ago, the eventual development of scientific control of the methods and means of production is welcomed perhaps a little prematurely; but in thousands of industrial laboratories to-day 'the unerring laws of chemistry,' and B.D.H. reagents, enable the conduct of the chemical arts to be successful and economical...and as civil as you please.

B.D.H.
LABORATORY CHEMICALS

THE BRITISH DRUG HOUSES LTD. B.D.H. LABORATORY CHEMICALS GROUP POOLE DORSET
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Chemical & Allied Stocks & Shares

STOCK markets developed renewed strength this week because of confidence in the City as to the outcome of the General Election. There was increased demand for leading industrial shares with Imperial Chemicals outstandingly good up to the new high level of 48s. In contrast with the strength of industrial shares, however, British Funds have been uncertain and lower on balance. This uncertainty in gilt-edged stocks reflects conflicting views whether the Bank rate will go up further from 4½ per cent to 5 per cent later in the year and if recent hopes of an autumn Budget with further tax cuts will be borne out.

The Imperial Chemical results for the past year created an excellent impression. Profits were in excess of expectations and the 10 per cent dividend on the doubled capital was in accordance with general estimates. Moreover, the City welcomed Dr. Fleck's statement that I.C.I. will fight the threat to nationalise sections of the chemical industry. A feature has been buying of Imperial Chemical shares by US investors. This is because of comparisons brought out by a review issued by well-known members of the New York Stock Exchange showing that the rate of increase in I.C.I.'s earnings has exceeded that of most of its US rivals, and that, moreover, the group's earning power has yet to benefit fully from large capital expenditure. In fact the assumption in many quarters is that, on present indications, there may be reasonable prospects of a further dividend increase for the current year. The present price of 49s. 10½d. for I.C.I. shares compares with 43s. 3d. a month ago.

During the same period many other chemical shares have also moved in favour of holders, Laporte 5s. shares for instance, from 16s. 9d. to 18s. 6d., Fisons from 52s. 6d. to 55s. and Monsanto were up to 30s. 3d., while Albright & Wilson 5s. shares strengthened from 28s. 3d. to 29s. 3d. Hickson & Welch 10s. shares have been in good demand and were up to 24s. xd, compared with 21s. a month ago. Reichhold Chemical 5s. shares were good at 17s. 6d. xd on the full results and chairman's statement indicating prospects of a further increase in distribution for the current year. Ashe Chemical 1s. shares strengthened to 1s. 9d., British Chrome Chemicals 5s. shares firmed up to 13s. 6d. and British Glues 4s. shares from 13s. 9d. to 14s. 3d. Moreover, Lawes Chemical 10s. shares rose from 13s. 9d. to 14s. 3d., Hardman & Holden 5s. shares were 14s. 3d. and Brotherton 10s. shares firm at 33s. 3d., William Blythe 3s. shares showed activity around 17s. 9d. and Boake Roberts 5s. shares have risen to 15s. compared with 13s. 9d. a month ago.

The raising of the dividend to 27½ per cent and the proposed free scrip issue of one new share for every one held put Boots Pure Drug 5s. shares up from 28s. 1½d. to 34s. 9d. In other directions, British Drug Houses 5s. shares strengthened to 13s. following the higher dividend. Greeff-Chemicals Holdings 5s. shares were 16s. 10½d. xd. Coalite & Chemical 2s. shares changed hands around 4s. while elsewhere, British Oxygen advanced on the month from 61s. 9d. to 67s. 3d. Unilever remained under the influence of the results and were 82s. compared with 77s. 3d. a month ago. Among plastics, British Xylonite were firm at 40s. xd and Bakelite 10s. shares 29s. 3d. xd. British Industrial Plastics 2s. shares were 5s. 10½d. Oils have been active, particularly B.P. which rose to the new high level of 90s. 9d. following the past year's results and the chairman's annual statement.

Delegation Visits GEC

A PARTY of 24 members of the Parliamentary and Scientific Committee recently visited the Wembley research laboratories of The General Electric Co. The Committee, composed of members of both Houses of Parliament and representatives of scientific institutions, provides liaison between scientific bodies and Parliament.

During their 2½ hour tour the members saw many of the activities of the laboratories which cover an area of 500,000 sq. ft. and employs a staff of over 2,600, of whom about 700 are graduates. The party saw work on semi-conductors, high power rectifiers, electronic valves, lamps, glass and refractories, and metallurgy, and was afterwards entertained to luncheon.

JMS

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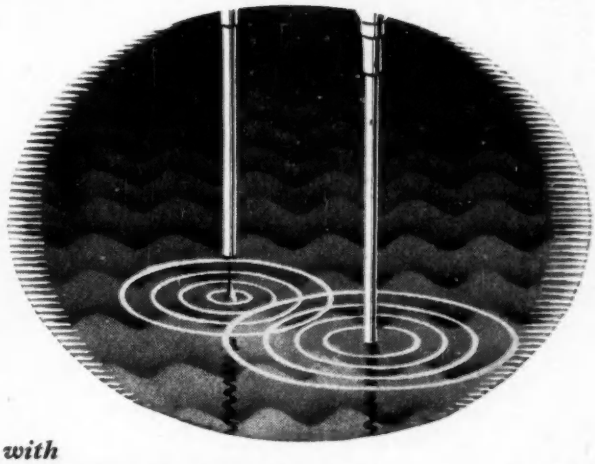

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BRITISH INSTRUMENT INDUSTRIES EXHIBITION
EARLS COURT LONDON
June 28 - July 9 1955

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive, or a woman aged* 18-59 *inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order,* 1952.

ASSISTANT CORROSION ENGINEER required by **KUWAIT OIL COMPANY** for service in Kuwait. Applicants must hold a Degree in Electrical or Chemical Engineering or Chemistry or Physics, preferably with some knowledge of Metallurgy. In addition must have had at least two years' industrial experience. Work will be on corrosion mitigation problems which include scope for development of anti-corrosion techniques, installation and maintenance of protection stations and will be largely of a practical nature. Age 24-27. Salary starting not less than £830 per annum clear, plus generous allowances. Pension Scheme and kit allowance. Write for application form, giving brief details and quoting **K.1859 TO BOX E 37, c/o 191, GRESHAM HOUSE, E.C.2.**

CHEMISTS, capable of occupying responsible positions in Australia, required by Lewis Berger & Sons (Australia), Pty. Ltd., Sydney. Minimum qualifications, B.Sc. Age 30-40. Senior posts require at least 8 years' experience in the paint, varnish and lacquer industry. Applicants must have had service in a position of responsibility calling for organising ability and initiative. Suitable applicants will be interviewed in London during May or June. Apply in strict confidence, giving full details, to **PERSONNEL OFFICER, BERGER HOUSE, BERKELEY SQUARE, W.1.** marking applications "Australia."

GRADUATES in **MECHANICAL** and **CHEMICAL ENGINEERING** required for progressive positions in the Research, Design and Production Divisions of THE POWER-GAS CORPORATION LIMITED. Training given to men without previous industrial experience. Apply to:—**STAFF PERSONNEL MANAGER, PARKFIELD WORKS, STOCKTON-ON-TEES.**

THE UNITED KINGDOM ATOMIC ENERGY AUTHORITY, ALDERMASTON, BERKS. requires a **PRINCIPAL SCIENTIFIC OFFICER** or **SENIOR SCIENTIFIC OFFICER.**

DUTIES: To lead a team concerned with the development of new chemical plant.

QUALIFICATIONS AND EXPERIENCE: Applicants should hold a first or second class honours degree in chemistry or chemical engineering and should have had several years experience in chemical engineering practice as applied to research and development, and in pilot plant studies. They should have a sound economic approach to problems of technical development.

SALARY: Principal Scientific Officer £1,205 to £1,615 (male) : Senior Scientific Officer £1,040 to £1,205 (male).

SUPERANNUATION: The successful applicant will be required to join the Authority's contributory scheme.

HOUSING: Housing accommodation will be available within a reasonable period for married officers who live outside the radius of the Establishment's transport facilities or alternatively the Authority may be able to assist successful applicants in the purchase of a house.

Requests for application forms by **POST CARD** to **SENIOR RECRUITMENT OFFICER, A.W.R.E., ALDERMASTON, BERKS.** Quote reference 561/WGE/38.

DRAUGHTSMEN

VACANCIES for draughtsmen with experience in the following fields:—

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Working conditions and scope good. Five-day week, luncheon facilities, pension scheme. Initial salaries depending on age and experience up to £800 per annum for senior men.

Write Secretary,
HUNTINGTON, HEBERLEIN & CO., LTD.,
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YOUNG GRADUATE CHEMIST, interested in Chemical Engineering, is required in the laboratories of a Company in Sussex. Commencing salary dependent on age but not less than £600 per annum. Profit-sharing and Pension Schemes are in operation. Apply **BOX No. C.A. 3409, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE: 3285 EAST.**

COPPER TUBING—99 lengths by 16 ft. solid drawn. Second-hand in nice condition. 15s. per foot, ex-Works. **WARRINGTON CANNERS, LTD., RIVERSIDE WORKS, PENKETH, WARRINGTON.**

DEHNE FILTER PRESS—26 cast-iron plates, 25 in. by 25 in. 2 in. centre hole; screw 3½ in. diam.; 2 columns 3¼ in.; overall 9 ft. by 3 ft. 4 in. by 4 ft. high.

Good condition.

THOMPSON & SON (MILLWALL), LTD.,
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Tel. EAST 1844.

ECONOMIC BOILERS. Two 8 ft. diam., 220 lb. w.p., 5,000 lb. evaporation; three 7 ft. 6 in. diam., 160 lb. w.p., 4,500 lb. evaporation; 400 other boilers in stock.
STAINLESS PRESSURE TANK, 19 ft. by 5 ft. diam., 110 lb. w.p. Unused.
TWO 35 ft. long by 9 ft. diam. Lead-lined **TANKS.**
TWO Broadbent **WATER-DRIVEN CENTRIFUGES,** 30 in. diam., 12 in. deep, 1,150 r.p.m.
SIX Aluminium **CONDENSERS,** 14 ft. long by 2 ft. 3 in. diam. 386 Tubes, ¾ in. o.d.
FORTY Riveted **RECEIVERS,** 8 ft. 6 in. long, 5 ft. 6 in. diam., 75 lb. w.p. Numerous other sizes.
Solid Drawn **STEEL PIPES,** 6 in., 8 in., 10 in., 12 in., 14 in., thousands of feet in stock, plain and flanged.
CAST-IRON PIPES, 1,200 yds. 10 in. and 400 yds. 8 in., **NEW.** Also most other sizes, up to 24 in. bore.
VALVES in Stainless, Gunmetal, Enamel Lined.
CAST-IRON TANK PLATES, 2 ft. square. 500 in stock.
FRED WATKINS (BOILERS), LTD.,
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FOR SALE—Lister 4-cylinder Diesel Engine, direct coupled to Metro-Vick Alternator, 440v. 3 ph. 50 cycles, 4-wire with switch panel. Can be seen running, by appointment. Also separate 35 KVA Alternator 440v. 3 ph. 50 cycles, 4-wire with panel. **WARRINGTON CANNERS, LTD., RIVERSIDE WORKS, PENKETH, WARRINGTON.**

JANUS GREEN Water Soluble Powder, available in 5 kilogramme lots at £17 per kilogramme. A further quantity admixed with copper sulphate (mixture contains 12 per cent Janus Green) also available in 5 kilogramme lots at £2 10s. per kilogramme. **BOX No. C.A. 3407, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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TRIPLE-ROLL W.C. "BAKER" REFINERS—31½ in. by 15 in.—15 h.p., 400/3/50.
"Seitz" Unused **ALUMINIUM PLATE FILTER PRESS**—19—15½ in. sq. plates.
"Barron" **"U"-TROUGH MIXER**—7 ft. 6 in. by 3 ft. by 3 ft.
"Hind & Lund" **SIFTER/MIXER/SIFTER** with mixer 60 in. by 18 in. by 20 in. deep.
65 ft. Flat Belt 36 in. wide **CONVEYOR.**
40 ft. **TROUGH CONVEYOR**—30 in. wide.
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EXTRUDERS AND PLODDERS—5 in., 8 in. and 12 in. worms.
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COMPLETE VACUUM DRYING PLANT by Scott, comprising horizontal band drier, approx. 35 ft. long by 6 ft. with service feed hoppers, shaker feeder, condensate receivers for hotplates, vacuum augmentor, kek mill, screening and finished material hoppers, tailing elevator, wet and dry vacuum pumps. Fully motorised. Drier of the 7-band type, but has operated with 3 bands only.
ROTARY DRIER by Vernon of Paris, 30 ft. long by 4 ft. diam. construction ½ in. steel plate, running on two roller paths. Motor drive through girth gear and pinion. Fan, cyclone, and parts of furnace available.
5 **NEW TWIN-ROLL SPRAY DRIERS**—chilled cast-iron rolls 40 in. long by 32 in. diam., max. 74 lb./sq. in. w.p. fitted air cooled doctor blades, rotary disc. distribution trough, air spray jets and worm discharge conveyors. Ancillary equipment powder dresser, valves, gauges, all electrical gear for driving.
HORIZONTAL STEAM DISINFECTOR by Lennox Foundry. Int. dimensions 7 ft. long by 3 ft. diam. mild steel welded construction externally lagged, fitted steam coils in bottom. Hinged door each end with swing bolts. Removable galvanised trough, mounted on four bogies and guide rails. Steam wet pump vessel 20 lb./sq. in., steam coils 50 lb./sq. in., vacuum 20 in.
HORIZONTAL SINGLE TROUGH STEAM JACKETED MIXER by Gardner, 10 cwt. capacity, 6 ft. 3 in. by 2 ft. 4 in. by 2 ft. 5 in. deep, mild steel construction C. I. ends. Broken scroll agitator with bare shaft extension. Mounted on legs. Jacket suitable 30 lb. sq./in. w.p. Hinged cover.
2 **SINGLE ROLL EDGE RUNNER MILLS** by Torrance. 3 ft. 6 in. diam. cast iron construction 8 in. deep with roll 26 in. diam. by 6 in. face. Underdriven through crown wheel and pinion. Hand operated bottom slide discharge. Belt driven.
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Two steam jacketed **CAST-IRON FILTER PRESSES**—each with 38 s.j. plates and 39 frames, cake size 2 ft. 4 in. square.
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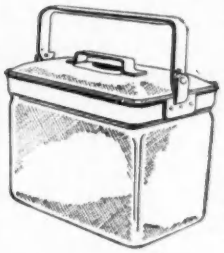

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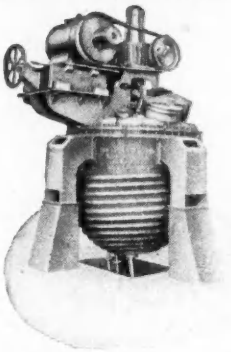

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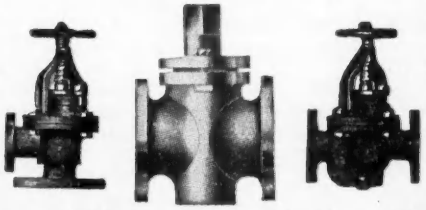

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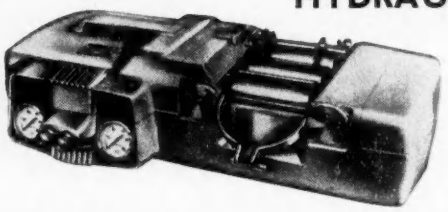

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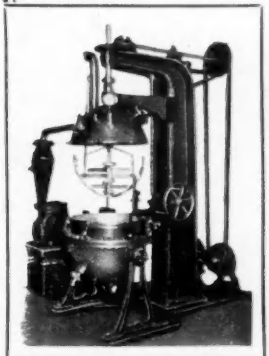

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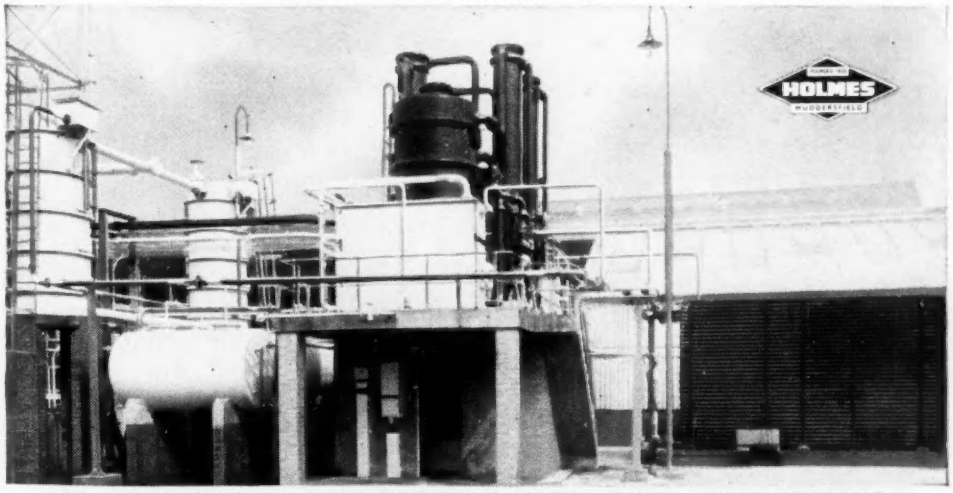

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